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# THE SURGICAL CLINICS OF NORTH AMERICA

Volume 3

Number 1

CLINIC OF DR JOHN B DEEVER

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## IRREDUCIBLE RIGHT INGUINAL HERNIA APPENDIX AND CECUM IN SAC

For this afternoon's clinic I think I can promise a number of interesting and I hope instructive cases. The first patient is a male sixty one years of age with an irreducible right inguinal hernia of one year's duration. He was sent to the clinic by his family physician Dr Wilden whom he had consulted because he thought the hernia was a little larger than usual. The doctor tried to reduce the hernia by gentle taxis but without success and so advised immediate operation. Proceeding I expose the scrotum and the right inguinal region and at once you will note a very large scrotum and much fulness over the lower portion of the right inguinal region. Percussion over the swelling gives a mixed note fair resonance above and flatness below auscultation over the upper part of the swelling reveals the presence of peristalsis but this is absent below. This then is not a strangulated hernia first because there are none of the subjective symptoms—pain vomiting inability to pass gas—and furthermore absence of the expression of a patient who is very ill. What is the difference between an irreducible and a strangulated hernia? An irreducible hernia is one that does not go back of itself and cannot be put back by taxis in this respect resembling a strangulated hernia but differing from the latter in that the circulation vascular and fecal is present both of which are absent in a strangulated hernia. The arrest of the blood vessel circulation is the danger point in a strangulated

hernia and therefore demands very prompt operation. There is another type of hernia that frequently causes some indecision as to the best thing to do and that is incarcerated hernia. This differs from either of the other types in that the fecal circulation alone is arrested. Practically all forms of irreducible hernia should be subjected to operation since taxis is more dangerous than incision and reduction. Taxis in fact is responsible for the high mortality in operation for strangulated hernia; it not only causes delay in the operation but bruises and contuses the contents of the hernia and in many instances causes bleeding into the wall of the bowel and the mesentery; furthermore it increases the danger of operation since bowel resection is so often required following it. With these results of taxis in mind we surgeons are often appalled to think that so barbarous and life-destroying a measure is still being taught to medical students. Two other causes of death are purgation and delayed operation due oftentimes to failure to make a thorough physical examination when the patient is first seen.

The patient being under the anesthetic we will now proceed with the operation. I carry an incision over the swelling dividing the skin, the superficial fascia and the aponeurosis of the external oblique muscle thus exposing the posterior layer of the anterior sheath of the rectus muscle, the arching fibers of the internal oblique muscle, the canal and a protrusion in the canal over which the cremaster muscle lies. I will now introduce the end of the handle of the scalpel beneath the free border of the arching fibers of the internal oblique muscle carrying it far enough upward and outward to lift up the arching fibers of the transversalis muscle following the knife with the tips of my two index fingers enables me to separate the peritoneum by breaking through the transversalis fascia and the preperitoneal fat for a sufficient distance from the transversalis muscle so that when the neck of the sac is tied and divided the stump will lie well up behind these muscles. An easy means of identifying the sac is offered by incising the peritoneum high up and carrying the finger through the opening and downward into the sac. This also simplifies the delivery and the removal of

the appendix for in operatin upon right inguinal hernia it is my practice with few exceptions to take out the appendix

When you anticipate removal of the appendix in a hernia operation I advise you not to do so without proper consent unless you know your patient very well otherwise you may have a law suit on your hands for having done an operation without the consent of the patient

Having opened the peritoneum and introduced my fingers I am able to carry the finger down through the peritoneal extension into the scrotum and demonstrate the presence of a large sac I now open the anterior wall of the sac together with the upper portion of the overlying walls of the scrotum thus exposing the intestine In grasping the contents of the sac between my fingers and thumb in this manner I find I am unable to withdraw them from the sac I will therefore carry the index fingers of my left hand well down into the sac and as I do so I meet with adhesions between the contents of the sac and the sac wall Upon separating these adhesions there is liberated a foul smelling dark fluid We have a culture made of this fluid Before going further with the reduction of the hernia into the wound I will thoroughly pad off the opening in the peritoneum in the upper portion of the canal hoping thus to avoid contamination by contact of the fluid contained in the lower portion of the sac I will pause here for a moment to say that in operating for a strangulated hernia after the sac is opened and before the constriction is divided the sac should be thoroughly cleaned so that when in dividing the constriction the communication between the sac and the peritoneal cavity is established there will be the minimum chance of peritoneal contamination Now then I will continue evacuating the contents and deliver them into the wound Much to my surprise I find that the contents of the sac consist of the terminal ileum the cecum and the appendix the cecum as you see is gangrenous and perforated (Fig 1) This will entail excision of the terminal ileum the cecum and a part of the ascending colon This having been done and the ends of the ileum and colon invaginated I make a lateral ileocolostomy and close the



upper portion of the wound. Next I will drain the lower part of the wound including the scrotal portion with gauze and one rubber drainage tube which will protrude through a counter opening in the base of the scrotum.



Fig. 1—Capitulum hernia, right side, with peritoneal sac. The peritoneal sac is shown protruding from the bottom of the incision.

The outstanding features in this case are the length of time the hernia has been present and the absence of symptoms. The presence of a bowel perforation which practically became extraperitoneal. The fact that there were normal bowel movements. The latter is explained by the absence of obstruction to the terminal ileum and the upper part of the cecum. Having

the inflammation and the perforation have been present is of course problematic

The packing will be renewed in three or four days. This means that the wound will heal by granulation. With this manner of healing a recurrence of the hernia is more apt to take place than when the wound heals by first intention. This is an additional argument for early operation for strangulated hernia. In the ordinary operation for inguinal hernia it is my practice to use linen thread for the deep sutures although it is not the practice of surgeons generally at the present day. My reason is that the tensile strength of linen is greater than that of either catgut or kangaroo tendon therefore is less likely to break during an attack of coughing or vomiting which occasionally occurs after operation. For this reason also in patients who suffer from chronic bronchitis or asthma I feel safer in using a linen suture since the breaking of a suture or sutures from coughing during healing means a recurrence of the hernia. For closing the deep portion of the canal I use the interrupted and not the continuous suture.

The objection to linen or silk sutures on the other hand is that if infection of the wound occur the suture or sutures become infected and unless they ulcerate out or are taken out by the surgeon a sinus or sinuses will form which means that healing is long delayed.

I want particularly to impress upon you the importance of a thorough knowledge of the anatomy of the region operated upon. This means safety and surety to the patient and easy work for the surgeon.



## RECURRENT ACUTE INTESTINAL OBSTRUCTION

THE next patient is a young woman twenty years old a nurse. She was operated upon in August 1919 in another hospital for chronic appendicitis. The wound became infected necessitating free incision and healing by granulation. Following recovery the patient remained well until four months ago when she commenced to have a slight sticking pain in the lower right abdomen coming on at any time but especially at night causing her to curl up as she put it. I was asked to see her on November 27 1922 when I found her suffering from incomplete intestinal obstruction for which I operated the following day finding extensive adhesions at the ileocecal junction and the surrounding region. Release of adhesions and closure of the wound were followed by an uninterrupted recovery. The patient remained well until three days ago when she developed symptoms of recurrence of the obstruction necessitating the present operation.

The patient being relaxed I will proceed to open the abdomen at the site of the original incision. I am able to show you the presence of adhesions involving the small bowel the terminal ileum and the cecum. These adhesions are easily released. Ordinarily what I have done should suffice as I have straightened the bowel and restored its normal lumen but in view of the fact that adhesions formed after my first operation for obstruction I think it safest to make an ileocolostomy between the terminal ileum proximal to where it was adherent and the transverse colon just distant to the hepatic flexure. I have practised this so often that I have no hesitancy in doing it in this patient. The most important point in this type of case is to operate at the earliest possible moment. It is futile and dangerous to hope that enemas stomach washings and drugs of any kind will benefit for they will not. Once the diagnosis is made operation is the only treatment. Even

should there be doubt as to the presence of obstruction it is better to operate and find nothing calling for mechanical relief than to operate and find a gangrenous section of bowel which always makes the outcome uncertain.

What is the after treatment in these cases of resection and anastomosis or anastomosis only as in this case? It consists chiefly in the relief of the pain by the administration of morphin or heroin enough of either to keep the patient comfortable. Nausea belching hiccup and regurgitation of dark fluid can be relieved by lavage practised as often as is necessary. It is our custom in anastomosis cases in dividing the large bowel not to give enteroclysis for the first twenty four hours. If there is occasion to administer fluid at once this can be done by intermittent or continuous hypodermoclysis or intravenous infusion until continuous enteroclysis is started. The patients are usually given an enema at the end of three or four days but never a cathartic. Where there is more than the normal amount of distention which is not relieved by an asafetida enema or by asafetida suppositories I advise hypodermics of eserin and strychnin. These are given in what we call courses of six doses  $\frac{1}{16}$  grain of eserin every hour with  $\frac{1}{16}$  gr in of strychnin with the first third and sixth doses. Eserin should not be given in mechanical obstruction until after the relief of the obstruction. I do not use pituitrin. I consider it a dangerous drug as compared with eserin and not as useful as the latter. Pituitrin in obstetric cases has been known to rupture the uterus and the esore is quite capable of rupturing the distended intestine. Its action is sudden and explosive while eserin acts slowly. The action of the two drugs may be compared to the powerful action of croton oil as against the mild aperient action of cascara.

Fluid either in the shape of water or of nourishment is not given by mouth after serious intraperitoneal operations until there is restoration of peristalsis as determined by auscultation or by the passage of flatus per rectum or into the enteroclysis container as noted by the nurse and sometimes by the patient himself. If the patient gets long well for the first three or four days it usually means that the sailing will be smooth after

that barring of course an occasional stitch abscess or wound infection. In my experience wound infection occurs in a certain percentage of the intestinal anastomosis cases no matter how careful the technic particularly when the anastomosis has been made for an acute obstruction.



## MULTILOCULAR PAROVARIAN CYST

I WILL next operate upon a young married woman thirty four years of age who has never had children. The patient has a history of chronic constipation. On one occasion in the spring of 1922 she was not able to have a movement of the bowels for several days and was finally relieved after the administration of several enemas. After the obstipation was overcome she discovered a tumor in the right side of the abdomen which has grown steadily since causing a continuous dull pain in the right abdomen. For the past two or three years she has had a full heavy feeling around the heart aggravated by walking or by excitement and relieved by belching or by a bowel movement. Slight edema of the ankles has been present for the past year. Until recently menstruation was regular of the twenty eight-day type. At present she has two or three periods every month. The patient also gives a history of a fall seven years ago when she struck the right side of her abdomen.

Physical examination of the abdomen shows a hard slightly nodular tumor which descends very little if at all on deep inspiration and extends from the right costal margin down to Poupart's ligament and from the right anterior superior iliac spine across the abdomen 2 inches below the umbilicus to the junction of the ninth costal cartilage with the external edge of the left rectus muscle. The tumor does not seem to be connected with the liver as there is an area of tympany between the right costal margin and the supposed upper edge of the tumor. The liver is not palpable even on deep inspiration. In the lower midabdomen the mass is cystic with dullness, fluctuation and a fluid impulse. There is tympany in both flanks. By vaginal examination there is a palpable mass to the right of the uterus which seems to be a part of the abdominal mass. The blood count shows a slight secondary anemia with a slight leukocytosis and increased polynuclear cells. The urine is negative except



for a faint trace of albumin. Blood urea and phenolphthalein tests are normal and the Wassermann test is negative. Cystoscopic examination (by Dr MacKinney) is practically negative with the exception of the right kidney from which there was no indiocarmine elimination. The report reads: Ureteral pressure with back pressure from a neoplasm.

The patient being ready I will open the abdomen through the right rectus muscle exposing a large tumor fibrocystic in type of the size and shape of a large watermelon. I hope to deliver this tumor intact and will therefore enlarge the incision and with careful and very gentle manipulation I am able to deliver it. You can now see that it is attached low down in the pelvis evidently having its origin in the right broad ligament. With the tumor thus on end as it were I pack off the peritoneal cavity with large square moist warm pads of gauze which with the patient in the Trendelenburg position gives you at will an unobstructed view of the pelvis. I am now able to say definitely that the tumor springs from within the right broad ligament. I am not able to recognize the tubes and ovaries since they in reality form a part of the base of the tumor. In order to extirpate this large mass I will amputate the uterus with the cautery from before backward through the supravaginal portion of the cervix first cutting through the serous covering of the uterus where it is reflected on to the bladder and with a small piece of moist gauze pushing the bladder forward carrying it well under the pubic arch. I now cut transversally through the supravaginal cervix grasp it with a pair of volvelli forceps making traction upward exposing the cervical canal which I at once cauterize with the actual cautery. The cavities of the broad ligaments being open I will introduce my fingers and enucleate the base of the tumor which is very easily done. In making this enucleation I am thoughtful of the uterus which with the tumor out of the way you are able to see. As you observe they are much dilated which is in keeping with Dr MacKinney's cystoscopic observations. By gently milking the ureters you will note I can easily empty them. I will now pass my hand up and palpate the kid-

neys which I find of normal size but with some dilatation of the pelvis as would naturally be expected I will tie the uterine and ovarian arteries and close the space between the layers of

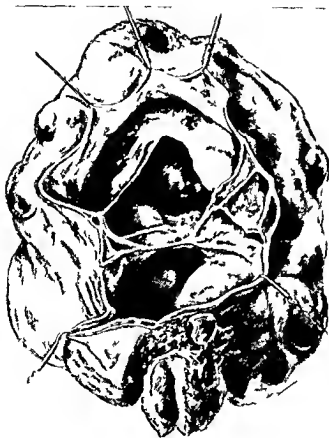


Fig 2—Ut mp t t d bo t be d l d d th b f  
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the broad ligaments by carrying a continuous catgut suture from side to side. It remains for me to remove the appendix and after removing the abdominal pad restore the intestines to their normal position and close the abdomen. Drainage

is not necessary. This patient will doubtless make a smooth recovery. The tumor was sent to the laboratory. The report reads:

*Macroscopy*—Multilocular cysts measure 33 x 70 cm and contain 4000 c c of turbid fluid. Small uterus is firmly attached to cyst and measures 5 x 4 x 3 cm. Endometrium is pale and smooth. No tubes, no ovaries.

*Microscopy*—1 Endometrium atrophied endometrium. 2 Cyst wall simple multilocular cyst.

## CHRONIC CALCULOUS CHOLECYSTITIS

THE next patient has been in the hospital several days with a diagnosis of calculous disease of the gall bladder. Operation was delayed chiefly on account of faulty kidney function. The patient, a male aged sixty five years, presents the following history. For the last forty four years he has been having indigestion manifested by gas and a feeling of discomfort in the abdomen. Ten years ago he began to have attacks of pain in the upper right abdomen radiating to the right shoulder and followed by jaundice. The pain often occurred at night but bore no actual relation to food intake although at times it was relieved by eating. Two years ago these attacks became more severe requiring morphin (which hitherto had not been required) for relief. The subsequent jaundice became deeper and the stools were clay colored. He has lost 20 pounds in weight in the last two months. There is no history of spontaneous vomiting. When induced the vomitus did not contain blood nor was there any blood in the stools. The patient has recently recovered from one of these attacks. Previous medical history is otherwise negative. The physical examination is negative except for tenderness on deep pressure in the upper right abdomen, no other areas of tenderness being discovered. Blood count: Hemoglobin 70 per cent, R B C 3,600,000, W B C 16,000, polynuclears 66, coagulation time five minutes. Blood urea 12 mm per 100 cc of blood. Phenolphthalein elimination 16 per cent. in three hours. Urinalysis showed the presence of bile. Although this man has been prepared for operation this afternoon I must confess I have some hesitancy in proceeding because I have not been able to satisfy myself that there is not an underlying condition of the kidney which may give postoperative trouble. I am reasonably sure however that the pathology in this patient's upper right abdomen cannot be relieved in any other way than by operation. The symptoms

—indigestion pain jaundice loss of weight—point to a lesion which warrants operative interference. I have tried to fortify the patient and justify myself by conferring with the director of our pathologic laboratory. Dr. Reimann as to the significance of the blood nitrogen and the phenolphthalein output. Dr. Reimann is in a position to judge the important question of operation from the laboratory as well as from the practical standpoint since he has had the opportunity as he always has to examine and make a clinical study of this case with us and can thus draw logical conclusions as to the significance of the above named conditions.

The patient being ready I will proceed with the operation. As is my usual practice in cases of this sort I make the incision through the upper right rectus muscle. Having opened the abdominal cavity I introduce the index and middle fingers of my left hand and determine as far as I can by touch the pathology its location etc. My fingers are in contact with the anterior edge of the liver which is somewhat contracted. I next try to locate the gall bladder. The chief difficulty in doing this as the gall bladder does not seem to hold its normal position in this patient. I have now located it far to the right and holding an oblique position from above downward and outward this will make its exposure and removal more difficult. The liver is rather small and contracted. I can feel the gall bladder filled with stones (which confirms the diagnosis of the referring physician Dr. Evans). I next place the retractors beneath the inner edge of the wound and hand them over to my assistant who will lift the abdominal walls which allows me to wall off the operative field. Next by placing the retractors in contact with the gauze packing and making traction inward and downward I will bring into view the field of operation with the gall bladder the stomach the duodenum the hepatic flexure of the colon and the great omentum united by adhesions. I will sever these adhesions with the fingers and gauze some are so well organized that I must cut them with the scissors. Separation or severing adhesions requires gentleness in order to avoid the risk of tearing the viscus to which they are attached. Having secured the

adhesions I examine the gall bladder. There is no doubt that its removal is the proper procedure since it is enlarged its wall hard opaque and very thin in fact there is some degree of calcification of the walls. Before taking out the gall bladder I will carefully examine the stomach the duodenum the pancreas inspect the lesser peritoneal cavity palpate the common duct and the spleen. Not finding anything wrong with these structures I next expose the cystic duct with the hepatic and the common duct at their junction by making a small opening in the right free border of the gastrohepatic omentum immediately overlying the commencement of the common duct. With the cystic duct exposed I carry a small pair of curved forceps beneath and with the end of the forceps lift the duct upward as you observe. I now grasp the duct at two points with small hemostatic forceps and cut it across with the cautery knife thus sterilizing both ends of the duct. Thus I consider a better practice than dividing it with either scissors or knife. Why? Because if there is any infection in the contents of the duct or its walls there is less chance of contamination. Holding the proximal end of the duct with the forceps I make traction upward and outward thus facilitating the removal of the gall bladder in other words every step of the operation is in full view of my eye so that in case of any anomalies I can observe them at once and deal with the condition in the safest possible way. Having lifted up the proximal end of the duct I separate the pelvis of the gall bladder from the common duct and the portal vein to which it has become adherent and now show you the cystic artery. Thus I clamp cut and tie and complete the removal of the gall bladder by dissecting it from below upward. You will note the appearance of the fossa or the bed of the gall bladder. Thus I will close with a continuous catgut suture carried through the liver forming the walls and the floor of the bed with the long round curved needle which carries the gut. Having completed the suturing I inspect the under surface of the liver which I see is satisfactory. Next I remove the packing in the subhepatic fossa or Morrison's pouch. I take the clamp off the distal end of the cystic duct and pass

a probe through it into and through the common duct into the duodenum when with the probe in the common duct and the point of it palpable in the lumen of the duodenum I can palpate the common duct thus hoping to make sure I have not overlooked a stone in the duct. This with palpation of the duct the probe is still one of the best means of detecting stones in the duct yet we may fail to detect a small stone for it is sometimes difficult to tell whether a very small enlargement (nodule) in the head of the pancreas at the point of its relation with the common duct may not be a stone. Therefore when still in doubt I pass a small gall stone scoop down the duct when if a stone is present upon its withdrawal a stone or some stony material will be delivered. Without this technic the operation for the removal of gall stones in the common duct will not have been complete. In operating for the removal of a stone in the common duct palpation as well as instrumental exploration is absolutely essential in order to avoid leaving a stone or small stones behind. I must warn you however that in exploring the hepatic duct there is a slight degree of risk of carrying a stone into either the left or the right hepatic duct. I have known this to occur. This again emphasizes the paramount importance of carrying out your manipulations with the greatest gentleness. You will note how lightly my assistant handles the retractors holding them loosely in his hands very much like holding the putter and in putting in playing golf following the wrist joint and not the forearms to do the work. I wish next to draw your attention to the care necessary in traversing the common duct to gain admission to the duodenum. In many gall stone cases where the ducts particularly the common duct have been involved in the infection and inflammation the opening in the pylorus of the stomach will not easily tolerate having a probe passed through it as when the common duct has not been affected. What I wish to convey to you is that the pylorus having been somewhat filled up by the insertion to the common duct this is more less irritable with some spasticity of the muscle of Oddi therefore when the point of the probe reaches the end of the duct it may be arrested. I think

conditions if you have used a comparatively large probe to start with you will find it necessary to change to a smaller one or even a very small one when by proper direction and very little if any pressure you will succeed in passing the probe. The small probe can be followed by a larger one and if necessary a still larger one. Should there be a small stone in the orifice of the papilla you will probably be able to dislodge it. Again I must warn you against using force as it is very easy to perforate the wall of the duct. I am sure that I have often displaced the papilla when there was a stricture present.

The common duct being clear and the pancreas and peripancreatic glands being found negative I will tie the stump of the cystic duct with chromic catgut. I then carry a small rubber drainage tube down to the stump of the cystic duct remove the small and large gauze pads and prepare to remove the appendix provided I can easily deliver the cecum this I find I can do. The gauze and instrument count being all correct the abdomen can be closed in the usual way.

Where there is considerable oozing instead of placing a rubber tube I introduce a small glass tube which is kept from overflowing by aspiration with a small glass syringe to which is attached a piece of rubber tubing long enough to reach the bottom of the glass tube. This is managed by the nurse. At the end of twenty four hours a rubber tube is carried down the glass tube and the latter removed by revolving it at the same time it is withdrawn. A word of caution in the use of the drainage tube if it is carried down beyond the stump of the cystic duct and into contact with the crus of the diaphragm it will occasionally cause the patient to cough. When this happens the tube should be lifted a trifle and the cough will be relieved.

We have been fortunate here this winter in having no serious postoperative pneumonias. I attribute this in great part to our operating under gas oxygen (without ether). For the occasional operator this will not answer much harm can be done if one has not trained himself to work with this anesthetic. In the majority of septic cases however gas oxygen will not



suffice since in order to prevent contamination the necessary relaxation cannot be obtained satisfactorily without ether

I have remarked that gas-oxygen anesthesia in this class of cases is not the most satisfactory anesthetic to work under. This I admit. My reason for giving it is that the kidneys will not be subjected to irritation and again the risk of postoperative pneumonia is practically nil. At this season of the year when influenza and pneumonia are so commonly seen it behooves the surgeon to be more careful. During the winter I have been doing most of my abdominal work under this anesthetic and am satisfied one can by practice learn to work with this form of anesthetic if he is gentle and patient. There must be absolute co-ordination between the anesthetist and the operator. I do not give ether with the gas and oxygen. Very rarely in a very serious cantankerous patient where they do not go under the anesthetic nicely I give a few drops of chloroform but this is so seldom done that it does not figure.

You will observe that I did the greater part of this operation under gas-oxygen anesthesia about the meanest anesthetic to work with in the abdomen. I was afraid to give this patient ether on account of the poor kidney function. In the after treatment special attention will be paid to the kidneys. I will tell his friend we have found two conditions diminished kidney function and a contracted liver both of which make the prognosis less favorable than it is in the majority of cases.

Before presenting the next patient I wish to say a word about the presence of jaundice as it occurred in this patient in the absence of stone in the common duct. This is not infrequently seen and is due to an extension of inflammation to the liver by way of the cystic duct or by way of the lymphatic connection between the gall bladder and the liver and in other cases to cholera or to inflammatory obstruction of the common duct to extension of the infection by the way of the lymphatics to the peripancreatic lymph glands or to the pancreatic enlargement of these and consequent obstruction of the common duct. The occurrence of jaundice in gall bladder cholelithiasis is the exception not the rule as in common duct cholelithiasis.

## RECURRENT CHOLELITHIASIS

THE patient now being wheeled into the amphitheater is a man forty seven years of age who was sent in for operation on account of jaundice and clay colored stools. This man has a history of typhoid fever twelve years ago. He had been a patient on the surgical service of this hospital from March 2 to April 25 1921 with a diagnosis of biliary calculus chronic pancreatitis and chronic interstitial cholecystitis. The operative findings at that time were Duodenum adherent to the liver stomach and pylorus normal liver overlying the gall bladder which contained stones hard adhesions between the hepatic flexure of the colon the duodenum and the great omentum common duct indurated and dilated clear yellowish bile obtained by hypodermic aspiration. Glands along the common duct and around the head of the pancreas enlarged hard and nodular. When the gall bladder was removed the posterior wall was found to have been ulcerated through by a gall stone that lay in the gall bladder bed. The common duct was opened probed and drained with a rubber T tube and an additional small rubber tube carried into the subhepatic fossa. A part of the free portion of the great omentum was placed between the sutured gall bladder fossa the pylorus and the duodenum. The wound was closed in the usual way. A chronically diseased appendix was removed through a McBurney incision. Recovery was uninterrupted. The T tube was taken out thirteen weeks after operation. The patient remained perfectly well until Thanksgiving 1922 when he developed what was diagnosed rheumatism of the back and the mullumbar region. Following this he developed severe pain throughout the abdomen requiring several hypodermics of morphin for relief. Several days following this attack the patient became jaundiced the urine became dark and the stools clay colored. The onset of jaundice was preceded by chill fever and sweats occurring during the

night and morning. On admission the patient complained of slight pain referred to the right hypochondrium, some degree of jaundice, stools still clay colored. Blood pressure 105/60. Phenolphthalein and blood urea tests are practically normal. Urine contains bile albumin and granular casts. Diagnosis: Calculous obstruction of the common duct. I will begin by cutting out the scar of the previous operation and cautiously open the abdomen at this site. I next expose a rather conglomerate looking mass composed of the lower portion of the right lobe of the liver, the hepatic flexure of the colon, the duodenum and the stomach. First I free the great omentum which you can see is uniformly adherent to the parietal peritoneum and the above mentioned parts. I have released the omentum with the exception of the portion interposed between the liver and the adjoining structures. This quite well exposes the hepatic flexure which holds a high position owing to its being tightly adherent to the lateral peritoneal wall and the under surface of the liver. Finding it is rather difficult because of my desire to prevent injury to the bowel. Fortunately I have succeeded. I now displace the flexure downward and at the same time protect it with a layer of moist gauze against which my assistant will place the retractor in order to hold it out of the way so as to expose the under surface of the liver to which are attached as you now observe the great omentum, the stomach and the duodenum. I next attack these organs and show you the right free border of the gastrophrenic omentum and the head of the pancreas embraced by the duodenum. This gives me an opportunity to examine the pancreas which I find to be normal in size and consistency. I will ask my assistant to grasp the head of the pancreas with the duodenum also carefully to palpate the body of the pancreas and ask him what his impressions are. Answer: Normal gland. This clearly proves the good effect obtained by the prolonged drainage following the previous operation. You will observe that by drawing the liver outward I now pass the point of my right index finger through the foramen of Winslow. Between the layers of the omentum at this point are the common duct, the hepatic duct

the portal vein and the hepatic artery. The structure farther to the right therefore nearest to me as I stand on the right side of the patient is the common duct. The duct is very clearly seen in this instance somewhat larger than normal with rather opaque wall due to the injury it sustained prior to the first operation. To prove that this is the duct I aspirate it and obtain bile. You will further note that as I roll the duct forward and upward I expose the portal vein. I next palpate the duct rather low down when I feel a hard body which with the point of my finger I am able to carry up into the more accessible first portion of the duct. This evidently is a stone which I am able to remove by holding it in position and dividing the walls of the overlying duct. Having removed this rather large stone I pass a small gall stone scoop down into the duct and upon withdrawal of the scoop I find I have removed another stone. Again I examine the duct by carrying the end of the scoop through the duct down to and through the papilla of Vater. I next carry the scoop up into the main hepatic duct and the two primary branches but find nothing. I will drain the common duct with a rubber T tube. With the tube *in situ* the incision in the duct wall is closed on either side of the vertical branch of the tube. Next I carry a small rubber tube into the subhepatic fossa remove the gauze pads and close the wound.

The chief points of interest in this case are. The recurrence of symptoms after a previous operation for the relief of a condition somewhat similar to the present, also the finding at the first operation of chronic pancreatitis with chronic pancreatic lymphangitis which cleared up entirely after drainage of the common duct for thirteen weeks, chronic cholecystitis, chronic circumscribed hepatitis with an underlying diseased gall bladder together with enlarged glands along the common duct and the fact that the patient remained well until the common duct became obstructed by a stone. The diagnosis of the present illness was much easier than of the former condition, the pain, chill, fever, sweats and jaundice being typical of stone in the common duct.

The more commonly ascribed cause for recurrence of symptoms after operation for gall stone disease are overlooked stone or stones adhesions injury to the ducts resulting in stricture of the duct or cutting of the common or the hepatic duct at operation and failure to have recognized and repaired the rent. In the late cases in the absence of marked jaundice pathology in the peripancreatic glands and the pancreas itself is the most common cause of the recurrence. The second most common cause is adhesions of the structures in apposition with the original field of operation. The cases presenting gall stones at the second operation are in my experience those in which the gall bladder had been drained at the first operation.

In the experience of this clinic prolonged pathology is the most common cause. In other words failure to make an early diagnosis or having made the diagnosis procrastination in advising surgical relief. The internist occasionally tells us much of his clinical material is made up of patients suffering from recurrence of symptoms following operation for gall stone disease and ulcer. The answer is So many of the patients for which either of these operations have been made were long sufferers before operation in other words the diagnosis was not made early enough for early operation. Late operation better of course than no operation at all reveal late pathology—pathology which is no longer confined to the point of the original focus but extended well beyond the point involving adjacent structures in the shape of chronic pancreatitis following medically maltreated gall bladder disease. Medical treatment cannot cure a chronically infected gall bladder or an old chronic ulcer.

I will now discuss a few operative histories presenting points of interest and of value to the inexperienced as well as to the experienced among you.

## DIFFERENTIAL DIAGNOSIS ACUTE APPENDICITIS vs ACUTE PANCREATITIS

THIS case a woman sixty three years old was admitted with a diagnosis of acute appendicitis. Upon the morning of the day of admission she was seized with acute epigastric pain which soon became cramp like and generalized. The patient took a dose of castor oil which she promptly vomited but did not vomit after this. Examination showed a distended abdomen and very little peristalsis audible only in the upper abdomen. There was general abdominal tenderness most pronounced in the lower right quadrant also generalized abdominal rigidity. Breathing was chiefly thoracic. Examination of the chest proved practically negative with the exception of a few moist rales at the angle of the right scapula. heart sounds poor no murmurs. Vaginal examination negative except for slight tenderness in the fornices more marked if any than in the right fornix. Rectal examination negative. There was some pain with tenderness over the region of the left kidney. Blood examination on the day of admission. No anemia white cell 15 000 and polynuclears 74 three days later leukocytes 13 000 with polynuclears 69 and eight days after admission leukocytes 20 700 with polynuclears 64. Urine normal. Phenolphthalein blood nitro en Wassermann and blood sugar test normal. Cystoscopic examination negative. The temperature and pulse rate slightly increased. Blood pressure is 155/80. This patient was not operated until ten days after her admission as we were not at all sure of the diagnosis and operation did not seem urgent.

At the operation a low incision was made through the right rectus muscle extensive fat necrosis was found also a chronically diseased appendix which was removed. Operative diagnosis Acute pancreatitis.

This patient made an uninterrupted recovery. This case

demonstrates some of the pitfalls in abdominal diagnosis and that acute pancreatitis is not necessarily fatal if not operated upon. But it must be remembered that all cases of acute pancreatitis do not terminate so happily as this one.

## SUBACUTE PANCREATITIS

MALE aged forty six years was admitted to this clinic with chief complaint of pain in the epigastrium Six weeks before admission while at work he developed sudden severe sharp pain around the navel followed immediately by collapse He was at once taken to another hospital where he remained until a day or two before coming here After recovery from the acute symptoms he continued to have intermittent paroxysms of pain There was no history of vomiting or jaundice Upon admission he still complained of a constant dull ache in the upper midabdomen He gave a history of two previous similar attacks one in 1917 the other within the last year there was no history of chronic indigestion In both of these attacks the patient was shocked and remained under treatment for ten days When well he eats much and drinks rather freely No urinary symptoms except nocturia Blood pressure 115/78 Examination of blood and urine negative Stomach analysis negative kidney function normal blood sugar 250 m<sup>m</sup> per 100 cc Wassermann negative x ray persistent deformity in the duodenum suggestive of ulcer Physical examination negative except for ep gastric tenderness and slight rigidity to the left of the epigastrium with an indistinct palpable mass Diagnosis Subacute pancreatitis

The patient was prepared for operation intraspinal novocain anesthetic 11 centigrams was given The abdomen was opened through an upper right rectus incision revealing extensive fat necrosis enlarged pancreas and a chronically diseased gall bladder The gall bladder was drained Shortly after operation the patient developed symptoms of respiratory failure attributed to the novocain artificial respiration intravenous saline with pituitrin atropin and caffeine hypodermically and the administration of oxygen were of no avail and the patient died



These 2 cases are of interest from a diagnostic standpoint. The first one did not present any symptoms warranting a diagnosis of the real lesion while in the second one the diagnosis seemed to us comparatively clear. In neither case was there the persistent vomiting, rapid and weak pulse, cyanosis or lividity of the skin as usually associated with acute pancreatitis. In the first patient there was no history of depression or the pain severe enough to be characteristic while the second patient presented marked depression following the very acute pain with marked local signs which were absent in the first. In the first patient there was a decided leukocytic reaction after several days while in the second patient the blood was negative. This I believe will impress you with the unreliability of laboratory findings in some cases and of the importance of the physical findings. The question of anesthesia comes up here. If we had given ether or a general anesthetic to the second patient we might not have had a fatality certainly not an immediate one. In intra-painal anesthesia I care not what drug is used the patient is exposed to the greater danger of immediate death. You frequently have heard me discourse on the trials, tribulations and joys of a surgeon. This is one of his tribulations.

I have no doubt that cases similar to the second patient are more common than is generally believed. I am of the opinion that many of the conditions diagnosed acute indigestion where the patient has a history of having eaten rather excessively is stricken with sharp acute epigastric pain followed by depression which lasts only for a short time and recovers in five or six days are in reality instances of mild pancreatitis. The pathology in these cases is very light usually only punctate hemorrhage into the pancreas. In practically all of these cases a very careful physical examination and study will reveal in addition to the epigastric fulness tenderness and often an indistinct palpable mass chronically diseased appendix or gall bladder.

## SEQUELÆ OF SUPPURATIVE APPENDICITIS

THE last case I will discuss with you this afternoon is that of a boy fifteen years old admitted several days ago with suppurative appendicitis who in addition to the primary operation for the appendical condition underwent two further operations for right sided empyema and intestinal obstruction. This should impress you with the danger attendant upon appendicitis advanced to the suppurative stage. In fact the pathologic possibilities of acute appendicitis have no limitations among the more serious ones are Peritoneal toxemia secondary abscess intestinal obstruction pyelophlebitis septic pneumonia empyema hemiplegia phlebitis and parotitis. In this clinic where we have many cases of suppurative appendicitis we are constantly meeting with one or another of these conditions therefore let me warn you to advise operation in acute appendicitis at the earliest possible moment before the peritonitis has gotten beyond the site of the appendix.

This boy who has been having some abdominal discomfort was accidentally struck in the abdomen while playing at school three days before admission. The same night there was a recurrence of the pain in the lower abdomen and the next day the pain was generalized over the entire abdomen. The day before admission the pain became more and more severe and then localized in the lower right quadrant. He was given a dose of magnesia which was followed by several evacuations. On admission to the hospital there was generalized abdominal rigidity with considerable distention pronounced general tenderness absence of peristalsis increased pulse rate and temperature. He was thereupon put upon anatomic and physiologic rest the Murphy drop ice bags to the abdomen and morphin just enough to keep him free from pain. After twenty four hours there being a definite localization in the lower right abdomen operation was performed.

A perforated appendix was found with pus along the outer side of the colon in the subhepatic space and in the pelvis. Separating the liver from the overlying abdominal wall resulted in the discharge of a large amount of puruloid material with a rather definite color and a colon bacillus odor. The pelvis was filled with colon bacillus pus. All infectious areas were thoroughly drained and the wound left open.

The boy went along satisfactory for two weeks when the respirations increased, breathing became embarrassed together with pain referred to the upper right abdomen and the lower right chest accompanied by a rise in temperature and increased pulse rate. This continued for two days when by careful physical and fluoroscopic examination fluid was demonstrated in the lower right pleural cavity.

The second operation consisted of drainage and the removal of about 2 inches of the tenth rib with liberation of a large amount of pus. After this the boy did well for seventeen days when he developed acute intermittent abdominal pain with exaggerated peristalsis, vomiting, etc., leading to a diagnosis of acute abdominal obstruction. The third operation revealed coils of small bowel adherent to the overlying parietal peritoneum at the site of the previous operation and to one another. These adhesions were severed and the abdomen closed. Following this the boy recovered slowly but completely and was discharged with a granulating wound sixty-six days after admission. The empyema was evidently caused by ascending infection from the abdomen through the diaphragm by way of the lymphatics.

In this connection and before dismissing you I would like to say a word about appendical peritonitis. Appendical like all forms of peritonitis is bacterial in origin, the most common organisms present being the colon bacillus and the streptococcus, the severity of the peritonitis depending upon the character of the infection.

Acute appendicitis always causes a peritonitis and the seriousness of appendicitis depends entirely upon the extent of the peritoneal inflammation and the type of infection. On first seeing the patient we of course satisfy ourselves of the

diagnosis of acute appendicitis Our chief concern is the degree and the extent of the peritonitis the general appearance of the patient and the reaction to the peritoneal injection as determined by the pulse rate the character of the pulse the temperature the blood pressure the leukocytic and polynuclear count and what can be learned by careful examination of the abdomen In the presence of a peritonitis I carefully examine the abdomen noticing how it is influenced by the excursions of the diaphragm during respiration then auscult and next gently percuss and palpate I then have the patient breathe deeply short of causing him marked pain then let him cough hoping to get some idea of where the soreness is most marked

Peritonitis is frequently described as local diffused and general or universal Practically I believe it best to speak only of circumscribed and diffuse The differentiation of these varieties ordinarily is not difficult and can usually be determined by the area of rigidity or tympany or both the extent of tenderness and the difference in the degree of peristalsis over and around the inflamed area as learned by auscultation The stumbling block occasionally is peritoneal irritation which when present together with a circumscribed peritonitis is not always easy to differentiate from a diffused peritonitis The most reliable points in making the differentiation are the degree and extent of tenderness and rigidity and the presence of exaggerated or normal peristalsis The type of the infection makes little difference from the operative standpoint since other things being equal the earlier the operation the better the result and vice versa

The character of the inflammatory exudate whether serous serofibrinous or purulent is of moment only with regard to the institution of drainage When there is a purulent and especially a foul smelling exudate the method of choice is free drainage often with the wound left open The preferable drains are the Mikulicz rubber tube and occasionally a glass tube cigarette drains plain sterile gauze and large pieces of rubber dam In order to wall off the infected area or the abscess cavity I occasionally introduce a large piece of rubber dam

circumferentially and gently pack the cavity loosely with sterile or iodoform gauze. Clinical differentiation between the different kinds of exudate is not always possible although exquisite tenderness is significant of the presence of pus and is of much greater moment than leukocytosis. The most important lesson I wish to convey to you is when to operate in acute appendical peritonitis. I say operate upon all cases in the presence of circumscribed peritonitis when able to localize the lesion. In diffused peritonitis in a patient sick three or four days where the lesion cannot be localized treat by anatomic and physiologic rest lavage enteroclysis intermittent or continuous hypodermoclysis the object being to get plenty of water into the system without waterlo gun the intestines cold applications to the abdomen morphin to relieve pain and produce sleep. To the enteroclysis may be added whisky or expressed beef juice or liquid beef peptonoids etc. Hypodermic stimulation caffeine strychnin digitalis and camphorated oil are useful where the depression is pronounced.

In cases of diffuse peritonitis where the patient is not very ill and the lesion can be definitely localized immediate operation is indicated.

I am continually receiving inquiries as to the proper time to intervene in cases of peritonitis. I believe the point is well illustrated in what I have just said. In spite of the comparative frequency of acute appendicitis and the wide and general discussion of this subject it still remains one of the serious and perplexing problems of surgery. Experience and good judgment are now the of greater value than in this so apparently common ailment and yet more mistakes are probably made in this type of cases than in other less common disorders.

# CLINIC OF DR CHARLES H FRAZIER

## NEUROSURGICAL SERVICE UNIVERSITY HOSPITAL

### SOME OF THE SURGICAL PROBLEMS IN THE MANAGEMENT OF PITUITARY DISORDERS<sup>1</sup>

At this time I want to bring before you a series of cases illustrating disorders of the pituitary body and discuss more particularly the indications for and the results of operative interference. Let me say by way of preface that the surgeon is called upon chiefly to relieve pressure and in the case of a pituitary disorder the pressure phenomena are confined practically to the optic tracts the optic chiasm or the optic nerves differing thus from the effects of intracranial pressure in tumors of the brain where headache is one of the almost constant subjective disturbances.

Before reviewing individual cases let me say a few words as to the variety of lesions with which we have to deal and with which we should be familiar in the management of the individual pituitary patient. In this discussion of the surgical aspects of pituitary disorders we will recognize three groups.

*Group 1*—The first and by far the commonest is the adenomata representing probably 80 per cent of pituitary lesions. These adenomata are primary growths and while the clinical expression of the lesion may vary according to whether we are dealing with the adenoma chromophobe with hypofunction or the adenoma chromophil with hyperfunction is a matter of no practical surgical importance as the indications for operation in so far as visual disturbances are concerned and the method of attack in so far as the approach is concerned would be quite the same.

*Group 2*—In Group 2 we include lesions which while in

<sup>1</sup> A clinical Discussion of the Pituitary Body delivered to the students of the Graduate School of Medicine

circumferentially and gently pack the cavity loosely with sterile or iodoform gauze. Clinical differentiation between the different kinds of exudate is not always possible although exquisite tenderness is significant of the presence of pus and is of much greater moment than leukocytosis. The most important lesson I wish to convey to you is when to operate in acute appendical peritonitis. I say operate upon all cases in the presence of circumscribed peritonitis when able to localize the lesion. In diffused peritonitis in a patient sick three or four days where the lesion cannot be localized treat by anatomic and physiologic rest lavage enteroclysis intermittent or continuous hypodermoclysis the object being to get plenty of water into the system without waterlogging the intestines cold applications to the abdomen morphin to relieve pain and produce sleep. To the enteroclysis may be added whiskey or expressed beef juice or liquid beef peptonoids etc. Hypodermic stimulation caffeine strychnin digitalis and camphorated oil are useful where the depression is pronounced.

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Ad      Disorders of the Pituitary Body & its relation to the  
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most instances distinctly suprasellar at least have an anatomic association with the pituitary structure we refer to tumors of the pouch of Rathke and tumors of the hypophyseal duct. Both lesions are frequently associated with cyst formation but are quite different in structure. In the hypophyseal duct tumor we find papillary squamous epithelial cysts frequently calcified whereas in the tumors from Rathke's pouch the cyst wall is lined by a single layer of ciliated cylindric epithelium. Later on I will show you patients illustrating each of these two lesions.

**Group 3**—Under this group we include suprasellar growths which while not of pituitary origin at the same time frequently give rise to pituitary symptoms. These might properly be called neighborhood tumors and included therein would be the tumors of the third ventricle or choroid plexus endotheliomata taking their origin from the basal meninges and in some cases deep-seated gliomata.

**Symptomatology**—I will not attempt in the allotted time to review the symptomatology of pituitary disorder. You well know that there are two distinct types—one with acromegalic features the other embracing the so-called Frohlich's syndrome but let me remind you that in many instances the line between these two types is not always sharply drawn. In a number of cases there is overlapping and not infrequently the clinical picture combines features of both types of the disease. But as already said as surgeons we are particularly and almost exclusively interested only in the visual disturbances. The patient consults the surgeon either to conserve vision or to restore vision already lost. While the characteristic picture of pituitary disorder when fully developed—the bitemporal hemianopsia—is by no means constant. In the early stages one sees only quadrant defects. It is furthermore characteristic of the visual disturbances of pituitary that the process is more advanced in one eye than the other. Should the lesion have advanced to the point of optic atrophy which inevitably follows unless pressure be relieved such atrophy is more advanced in one eye than in the other so much so that in many cases that come to this clinic in at least 50 per cent. if not more the patient is already totally

blind or virtually so in one eye and it is not until loss of vision is threatened in the other that the patient becomes alarmed and consults the surgeon

**Radiography**—Routine examination of the patient with the  $x$  ray is essential both as an aid to diagnosis and as a guide to treatment. In the first place we must distinguish between the sellar deformations of the primary intrasellar lesions and the suprasellar growths. The primary intrasellar growth gives the characteristic deep cup shaped excavation of the sella with atrophy and erosion of the sellar floor. The suprasellar growth on the other hand presents a very different picture. In most cases there is no enlargement or deformity of the sella but the posterior clinoid processes have disappeared from atrophy and the sella appears elongated but not deepened in its dimensions. There are other things to be learned from the  $x$  ray. For example you may see in the case of hypophyseal duct tumors sharp definition of the tumor or the cyst wall which is revealed in the  $x$  ray pictures of the calcareous deposits and the same shadow may be seen in tumors of Rathke's pouch. We make it a habit to inspect in the  $x$  ray plate the sphenoid sinus as the sella enlarges downward it encroaches upon the sinus and in some instances you will find that the sphenoid sinus is practically obliterated. This bit of information is of value to the surgeon before the operation in that it gives him a clue as to the prognosis or rather as to what may be anticipated from the so called sellar decompression after the lesion has already decompressed itself sufficiently to obliterate the sinus but little relief should be anticipated from a decompression alone. To relieve pressure a considerable portion of the lesion must be removed. It would take us too far afield to discuss the interpretation of the ventriculo ram in suspected suprasellar growths but in doubtful cases we may at least be able to eliminate tumors of the third ventricle if as in the case from which this  $x$  ray picture was taken we find the third ventricle distended with air. Very briefly these are the important points of information to be derived from the roentgenologic study of the individual case.

**Treatment**—Now for the main theme of this morning's

demonstration. What treatment would you recommend for a patient with pituitary disease referred to you with failing vision? You will probably find that in the majority of cases the patient has already had a course of glandular feeding. This is the popular method of dealing with this emergency when it arises but how often it is effective I am not prepared to say. In practically all our cases this treatment has been employed for a longer or shorter period before the patient has been brought to us for observation. From what I hear however I am rather disposed to believe that the response of pituitary adenoma to glandular feeding is only of exceptional occurrence. The glandular extracts could of course have no effect upon lesions other than those of the adenomatous type. There remain to us for consideration but two therapeutic measures—radiation by x-ray or radium and operation. Whether or not you should be content to postpone operation in favor of radiation will depend in large measure if not entirely upon the visual disturbances. We must recognize a distinction in the visual disturbances between the effect of nerve pressure or nerve stretching such as might produce a hemianopsia and the effect of more prolonged pressure which eventuates in an optic atrophy. Given a case in which there is complete optic atrophy of one nerve and this is a very frequent circumstance and a partial atrophy of the other operation should not be postponed unless the patient fully understands that further delay may result in total blindness. If the case be of shorter duration and pressure phenomena have not advanced to the point of optic atrophy admitting a bitemporal hemianopsia it is perfectly proper providing the patient is under the observation of a competent ophthalmologist and providing treatments be carried out by one familiar with the technique of radiation in pituitary lesions under these circumstances to try the effect of x-ray or radium.

*x-ray*—A word should be said here I think in regard to this effect of radiation in pituitary lesions. Because of the distortion of the visual field characteristic of pituitary lesions we have very tangible index by which to determine the effectiveness or ineffectiveness of any method of treatment. It is not a matter

of gue swork so that one can say positively in any given case whether treatment by radiation is or is not effective according to whether the visual fields enlarge or remain stationary B  cl  re must be credited with the institution of this method of treatment and he has had under his observation a series of some 40 cases which he reports favorably influenced This is probably the largest series on record but in our own clinic we have had results in a smaller series of cases but sufficiently striking to warrant our faith in radiation particularly as a protection against recurrence after operation but in a few cases as an active agent in the treatment of recurrences The following may be cited as an illustration

A aged thirty was referred to me because of recurrence of visual disturbances following a subsellar decompression performed about one year before she consulted me She has in both eyes a bitemporal symmetric scotoma and in addition to this she complains more or less constantly of headache incidentally she has not menstruated for a number of years Before a second operation could be considered with propriety I thought we should try the effects of radiation To make a long story short under this treatment the headaches subsided menstruation was established and the bilateral scotoma entirely disappeared She has been free from recurrence now some five years We have in this case then conclusive evidence of the beneficent effect of radiation upon a recurring lesion

As another example of the favorable influence of radiation I present this patient E S aged nineteen File 66 933 was referred to me by her physician for headaches and failing vision A roentgenogram showed a sella turcica the dimensions of which were just a little beyond what we consider as normal There had been a rather rapid deterioration of vision in the last few months and there was a decided cut in the field of the right eye There were no other stigmata of pituitary disorder but from the x ray and eye findings a diagnosis of presumptive pituitary disorder was made and the patient referred to Dr H K Pan coast for radiation The patient has received three courses of treatment as the result of which her vision has decidedly im

proved the cut in the visual field of the right eye has almost entirely disappeared and with it her headache. The patient has received no other treatment and it would seem reasonable to assume from the sequence of events that our original diagnosis was correct and treatment appropriate.

*Surgical Problems*—We have by no means arrived at the point in the development of pituitary surgery at which there can be said to be well-defined and generally accepted indications for the selection of one or the other of the two operative procedures by which the lesion is approached. I refer to the transsphenoidal operation essentially an extracranial procedure and the transfrontal operation essentially an intracranial procedure. Which of these two methods should be the method of choice? The question cannot be answered in this general way. We have to take under consideration whether the lesion belongs to one or the other of the two general groups namely the primary intrasellar lesion the extrasellar or essentially suprasellar lesion such as the hypophyseal duct cysts and the tumors of Rathke's pouch. There is no difference of opinion so far as I know among neurologic surgeons as to the propriety of the transfrontal approach when as in this case there was no doubt that we were dealing with a suprasellar lesion. This boy J. E. aged seventeen File 63423 evidently presents the picture of pituitary disorder. His growth was arrested at the age of ten there are evidences of infantilism he has had periodic attacks of headache and vomiting there is total blindness in the left eye and hemianopsia in the right. This roentgenogram shows clearly the outline of the calcified suprasellar lesion. Clearly the proper avenue of approach in this case was by the transfrontal route. A flap was reflected the anterior horn of the ventricle tapped the frontal lobe elevated and with the head in the Rose position the tumor was readily exposed. Although at first it was thought to be a solid growth it was found later to be a cyst the wall of which was unyielding because of its calcification. The cyst contained about 80 cc. of a dark reddish fluid. As much as possible of the cyst wall was removed the lining of the cavity which remained swabbed with 30 per cent. iodine solution and the operation

concluded with closure of the dural and osteoplastic flap. The precise nature of the cyst is undetermined. Whether it originated in the hypophyseal duct is a matter of conjecture because upon histologic examination there was no evidence of any epithelial lining, nothing but fibrous tissue with calcification could be demonstrated. It is reasonable I think to assume however that the findings might represent a terminal stage of a process in which the epithelial structure had been replaced with fibrous tissue.

While considering the question of suprasellar lesions let me present this patient who happens at the time to be under observation at the hospital. She has I believe a suprasellar tumor, possibly a tumor of the pouch of Rathke. We have at least a very definite shadow in the x-ray of the calcified growth occupying a position immediately over the sella turcica. While I hesitate to make a positive diagnosis as to the precise nature and precise origin of the growth I am at least willing to say that should there be indications for operative intervention at this time I should recommend unhesitatingly an operation by the transfrontal approach because as you see in the x-ray film there is no enlargement of the sella turcica itself but the shadow of the tumor lies immediately above. The patient presents some interesting features.

Miss N., aged fifty-five years, has been complaining for the past four years of visual disturbances. She has not menstruated since she was twenty-six years of age and when thirty-five she was told that the pelvic organs were infantile in type. More recently her vision has become more defective. She complained of pain in the eyes and headaches and was sent to the Neurosurgical Clinic for an opinion as to whether or not an operation was indicated. The following were the positive findings in the history and physical examination: Headache and drowsiness, marked cutting in the temporal fields for both the 10 and 3 m. disks with some pallor on the temporal side of the disks, paresis of the right inferior oblique muscle, vision of the right eye 20/50 with glasses and of the left eye 20/30. The pituitary symptoms are represented by drowsiness, hemianopsia and a lowered metabolic rate ( $-51$  per cent.). The x-ray shows a normal sella turcica and the shadow of a calcified tumor directly

above the sella. She is receiving 3 grains of pituitary extract and  $1\frac{1}{2}$  grains of thyroid extract daily with intensive radiation.

The patient has been under observation four months and during this time there has been no further deterioration of vision. She has had less headache and less drowsiness and the metabolic rate has risen from  $-51$  to  $-29$ . The latter considered with other evidences of improvement must be attributed to the effects of the combined x-ray and glandular treatment.

These 2 cases illustrate very well the type in which a transfrontal operation should be the operation of election and this brings us to the consideration of the primary intrasellar lesions identified by the characteristic cup-shaped excavation of the sella. When confronted now with this condition invariably I practice the transsphenoidal operation followed in all cases by intensive radiation with the understanding that should there be a recurrence of symptoms as there may be a secondary operation by the same approach may be performed or preferably a transfrontal operation. I am quite willing to admit that in a certain number of cases the tumor may already have grown beyond the confines of the sella turcica and become in part at least a suprasellar growth and I recognize too the difficulties in determining in any case whether or not at the time of operation and to what extent the lesion may have grown beyond the limits of the sella turcica. But granting this I still maintain the transsphenoidal is the operation of choice if for no other reason than because the risk is measurably less than that of the operation which approaches the lesion from above. This statement is based on my own experience and on the reports from other clinics. It is significant that for the past three years we have not had an operative fatality in the transsphenoidal series. On the other hand we have had a number of deaths from transfrontal exploration and the mortality of those who routinely practice transfrontal operation has been acknowledged as 40 per cent. Comparing these two methods on the basis of the mortality alone there can be no question concerning our obligation to the patient as to which of the two should be the operation of choice.

During the convalescent period and before discharge the patient is referred to Dr Henry K. Pancoast for radiation. He then assumes charge of the case and directs the patient's return for treatment at certain specified intervals. The patient has returned for this purpose. Three years prior to his admission to the hospital he began to have headaches chiefly frontal and bilateral usually associated with nausea and vomiting. About one year ago he noticed some blurring of vision in the left eye which progressed so rapidly that in a few months vision in that eye was entirely lost. During the past three months his headaches have increased in severity and frequency until recently they have become almost daily occurrences and are associated always with vomiting. The following are the interesting features of his record: Drowsiness, headache, vomiting, optic atrophy complete in one eye and a hemianopsia in the other. The x-ray shows a sellar deformation typical of a primary intrasellar lesion. Before the operation there was tenderness on pressure in the left temporofrontal region and a herpetiform eruption at the angle of mouth and lower lip. At the operation a pituitary cyst was evacuated and the cyst cavity swabbed with tincture of iodine.

Pituitary cysts are the most unfavorable lesions with which we have to deal. Evacuation of the cyst is of itself not always sufficient to ensure permanent results because there is always the possibility of a cyst refilling with recurrence of symptoms. Just how this lesion should be dealt with is for the present undecided. Total extirpation of the cyst wall is not easy of accomplishment and could only be done by the direct transfrontal exposure. I would not leave you with the impression that these cysts always refill. I am reminded of a boy of seven who was under observation in this clinic in April 1918. At that time he had complete optic atrophy of the left eye and a temporal hemianopsia of the right eye with characteristic deformation of the sella turcica. A transsphenoidal operation was performed, a cyst evacuated and a portion of the cyst wall removed. There was complete restoration of vision in the left eye with relief of headache and there has been no recurrence since.

**Prognosis**—The efficacy of any plan of treatment should be



evaluated by the immediate mortality, the degree of improvement and the incidence of recurrence. We have already referred to the operative mortality and told you that by the transphenoidal method it had been reduced in our clinic in the past three years to zero. There has been improvement in vision in 15 per cent of our cases. The failures are attributed to the advanced stage of optic atrophy, to insufficient evacuation of the sella contents or to a lesion that had extended well beyond the confines of the sella turcica. The period of relief without recurrence would of course vary under different circumstances. With the routine employment of radiation after operation we confidently expect the incidence of recurrence to be materially reduced. We have employed this combined treatment in the clinic for only three years so that we must wait until a longer period has elapsed before drawing conclusions as to end results.

Resume.—Looking back over the past ten years in which time most of the history of pituitary surgery has been written we can, I think, point to certain very definite accomplishments. In the first place we have been able to differentiate with greater certainty between the primary intrasellar lesion (1) the adenomata so-called, (2) the suprasellar tumors of duct origin and (3) the so-called neighborhood or adjacent tumor. We have been able to lay down certain indications for the performance of one or two prescribed surgical methods of dealing with pituitary lesion. We have improved the technic of the transphenoidal approach so that the mortality has been reduced from 17 per cent or higher as it was when the operation was first introduced to zero as now practised. In the performance of the transphenoidal operation particularly many difficulties have been overcome by the use of direct illumination. We have learned the possibilities of direct irradiation of pituitary lesions particularly the adenomata. There are on record a number of cases in which by radiation alone the local and the disturbances have subsided and by combining operation and radiation we hope to prolong the period of improvement and possibly prevent recurrence. Taking it all in all this period of ten years has been singularly productive.

## CLINIC OF DR ASTLEY P C ASHHURST

### EPISCOPAL HOSPITAL

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#### CASES ILLUSTRATING THE SURGERY OF THE STOMACH

I WANT to bring before you this morning a series of stomach cases from which I think we may learn valuable lessons

**Case I Detachment of a Gastrojejunostomy**—The first patient a man forty three years of age entered the hospital September 14 1922. He had never been sick until nine or ten years previously when he developed pain in the abdomen and vomiting. Since that time he had had four different abdominal operations and was still very badly off in fact I believe he was worse then than he was before the first operation. His first operation done through an upper right rectus incision about nine years ago it is said revealed no lesions but five weeks later a second operation was done and at that time through a left rectus incision a gastrojejunostomy was done. He remained well for only four months when he returned to the hospital and was in that hospital off and on almost every year since that time up to August 1921 when a third operation was done which he says is recorded by an incision over his gall bladder region but he says that the gall bladder had nothing wrong with it. Again he felt better for a while but in June 1922 he came into the Episcopal Hospital then presenting already the three upper abdominal incisions and complaining of the same old symptoms. At that time my colleague Dr Mutschler did an exploratory laparotomy through an incision in the left semilunar line from the costal border downward. He found innumerable adhesions and after working for two hours abandoned the operation. After this the man felt well for about two weeks only. Since leaving the hospital in July he had had much pain and vomiting and had been in bed

most of the time and had been able to secure relief only through frequent doses of morphin. So then he came back to the hospital as I say in September when he came under my care. He was a fairly well-developed man but seemed in constant pain and was vomiting almost continually thin greenish mucoid material. His heart and lungs were negative as was his blood. Wassermann and his urine except for a few bialine and granular casts. His normal weight he said was 147 pounds, he weighed then 132 pounds so that he had not lost much weight in spite of his long illness. The abdomen showed between the costal margins and the umbilicus the four longitudinal scars already described and the rest of the abdomen was negative. Naturally I was very averse to the thought of doing any other operation on such a patient but he had real severe pain only relieved at night by morphin and every day or at least every few days he vomited a copious amount of bile-stained material. On September 21st an x-ray study of his gastrointestinal tract showed that the stomach emptied rapidly through the gastro-enterostomy opening and that it was empty at the six hour examination. There was marked stasis in the terminal ileum at the end of six hours. None of the barium meal seemed to pass by the pylorus. The small intestine just below the anastomosis whether proximal or distal could not be determined showing pouching and dilatation. No vicious circle could be seen. Dr Bromer said but he thought that the possibility of a gastrojejunal ulcer must be borne in mind. The patient begged me every day to operate on him and I kept him in the ward in order to be sure that he really was suffering and that he was not merely an asthenic and though I was inclined to believe that the trouble was due to the existence of vicious circle in his following gastrojejunostomy I could not be certain that the gastrojejunal ulcer which our roentgenologists suggested was not present.

On September 29th (fifteen days after admission) I operated on him with many misgivings recalling that the last time after working for two hours he did not succeed in finding anything except adhesions. It was difficult to choose the place

for the fifth incision in his upper abdomen but I selected the region just to the right of the midline leaving two scars on the left and two on the right making the incision 30 cm long and opening the parietal peritoneum very high up. I found the liver and the prepyloric portion of the stomach and the gall bladder all adherent to the parietal peritoneum and to each other. These were separated down to the foramen of Winslow which was found patulous. The gall bladder appeared normal and except at its fundus was free from adhesions. This region was temporarily packed off and the parietal peritoneum was opened below the area of adhesions just above the umbilicus and a pack was introduced to keep the small intestine from prolapsing. The adhesions of the omentum and the transverse colon and stomach and small intestines were then dissected free from one end of the incision to the other on the left side of my incision away over beyond the most left lateral incision thus completely freeing that side of the parietal peritoneum. Finally the jejunum was found densely adherent to the under surface of the mesocolon and was dissected free up to the anastomosis with the stomach which was patulous and where no ulcer could be felt. The afferent loop (duodenum) was obstructed because the surgeon who had made the gastrojejunal anastomosis (no loop method) had twisted the jejunum on itself so that the anastomotic opening lay more or less in the transverse axis of the patient's body. I will speak further of this fault in technic later. A sponge was passed beneath the anastomosis and one Payr clamp placed on the stomach and one on the jejunal loop parallel to the anastomosis and the anastomosis was divided between these clamps with the actual cautery. The stomach was closed with considerable difficulty owing to its high position and the transverse mesocolon was closed beneath the stomach and then the area of the jejunum in which the anastomosis was situated was excised and an end to end anastomosis done. To have sutured the opening into the jejunum would have caused too much stenosis. When after this procedure I made a revision of the wound before closing the abdominal wall I was upset to find that the pylorus seemed

thickened and it was almost doubtful whether it was sufficiently patulous especially in view of the report of the roentgenologist that no barium had ever been seen to pass by the pylorus. However as the operation had already lasted more than two hours I did not deem it wise to prolong it either to do a pylorotomy or even to remove the appendix.

On the fourth day after operation the patient vomited four times and on the fifth day five times but as he still vomited bile I was satisfied that the pylorus was actually patulous and this was proved by an x-ray study made on the fifth day after operation which showed the barium passing freely by the pylorus. The last time that he vomited in the hospital was October 13th two weeks after operation when he vomited five times very profusely. Before leaving the hospital an x-ray examination showed that the stomach was very small and lay high up in the epigastrium that it emptied rather rapidly that there was no 12 hour retention that there was a filling defect at the prepylorus probably due to adhesions but nothing to indicate a definitely localized ulcer. On November 3d he was discharged free from symptoms having been walking around the ward in perfectly good health for more than two weeks. When seen again 12 weeks later his weight had returned to 145 pounds only 2 pounds less than normal and he had vomited only twice since leaving the hospital.

Now such a patient as this who has suffered many things at the hands of many surgeons may be thankful to have his anatomy restored as nearly to normal as possible. The only criticism that I think I could make in addition to condemning the unnecessary operations which have been done upon him is that he has never had his appendix removed and perhaps I should have done that myself but he had enough other trouble when he was under my care to make me willing to postpone that for another occasion.

He was again under observation with a definite bout of Christmas time. His nausea and occasional vomiting was rapidly and entirely relieved by attention to diet. He slept so deeply that hypodermic injection of sterile water at a few occasions he complained of sleeplessness and pain.

**Case II Duodenal Ulcer Unrelieved by Cholecystostomy done for Upper Abdominal Symptoms**—Speaking of doing unnecessary operations I have had the following experience myself. In 1914 I operated on a man George G. then forty four years of age who had had inflammation of the stomach as he called it when sixteen years of age and this continued for seven months. He said that he meant by inflammation of the stomach severe pain in the stomach and vomiting. He was perfectly healthy from that time up to the age of twenty five years but from the age of twenty five years up to his present illness when he was forty four years of age he had had periodic attacks of vomiting and severe colicky pains in the right upper abdomen. These attacks used to last for several weeks at a time. He would first regurgitate his food with nausea followed by severe pain agonizing and colicky in the upper abdomen and relieved only by medicines. Between these attacks he felt very well. The attack for which he came under my care in 1914 had begun three weeks previously with similar symptoms. These symptoms lasted up to the night before admission when he was suddenly stricken with severe colicky pain in the right abdomen which lasted four hours. This pain radiated to the opposite side and to the left shoulder but never to the right shoulder or downward. Since admission (August 11 1914) there had been less acute pain and only soreness in the back and the stomach. There was no history of any urinary trouble. His normal weight was 165 pounds. Examination was negative except for tenderness over the gall bladder especially at the end of deep inspiration and slight tenderness in the right costovertebral angle.

Operation on August 14 1914 showed the gall bladder adherent to the hepatic flexure of the colon and the liver adherent to the duodenum. The pylorus was lightly adherent but it admitted the finger easily and there were no ulcers or cicatrices palpable. As no stones were found in the gall bladder or ducts the gall bladder was drained. Culture of the bile was negative. He went home about four weeks after operation saying he felt very well but in September 1920 about six years later he came back complaining of much the same symptoms although the

thickened and it was almost doubtful whether it was sufficiently patulous especially in view of the report of the roentgenologist that no barium had ever been seen to pass by the pylorus. However as the operation had already lasted more than two hours I did not deem it wise to prolong it either to do a pylorotomy or even to remove the appendix.

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He was again under observation in the ward for about week at Christmas time. His nausea and occasional vomiting was rapidly and entirely relieved by attention to diet. He slept soundly all night after hypodermic injection of sterile water on the few occasions when he complained of sleeplessness and pain.

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present attack had begun only about three months previously. He vomited one or two hours after his meals after having epigastric pain for some time. Nearly every night he vomited about six hours after his evening meal. He felt better when the stomach was empty. He had never been jaundiced and said that he had lost 20 pounds in the last three months. He said he was not improved by the gall bladder operation six years previously but had been worse than usual for the last few months. x Ray examination by Dr Bromer showed the

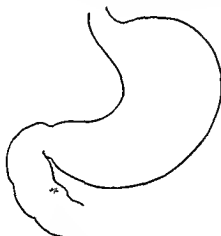


Fig 3—Chronic duodenal diverticulum. The existence is felt.

stomach in fair position no tenderness no filling defects suggestive of ulcer tendency to pylorospasm probably reflex. Slight stasis in the terminal ileum at the end of six hours which might suggest adhesion but there were no points of tenderness which are usually found where there are adhesions. The twenty-four hour examination was negative. So under the diagnosis of pylorospasm I operated on this man on September 14, 1920. I found the omentum densely adherent to the former scar and after identifying the pylorus though I could palpate a suspicious mass in the duodenum. This appeared to be in

the descending part of the duodenum on the posterior median wall. After separating the duodenum from the gall bladder to which it was densely adherent and mobilizing the duodenum this mass was clearly evident—a chronic ulcer of the duodenum (Fig 3) and I suspected very strongly that it had been there at the time of my operation six years before but that I had not made a sufficient search to locate it. A posterior gastrojejunostomy was done as it seemed impossible to excise an ulcer in this situation. The man recovered uneventfully and had no recurrence of symptoms. He reports (January 6 1923) that his health is excellent and that he can eat anything peccifying beans and cabbage. He works at night as a fireman's helper.

**Case III Duodenal Ulcer Not Discovered During an Exploratory Operation Nearly Four Years Previously**—Not long after the operation which I have just described there came under my care another patient Harrison R. a man twenty six years of age whose chief complaint was nausea and vomiting. He had been operated upon in a Naval Hospital in July 1917 for acute appendicitis. About five weeks after the appendicitis operation he says he had fecal vomitus and then had a second operation done which he thinks was an intestinal resection. In April 1919 he had an exploratory upper abdominal operation done but the surgeon found nothing but adhesions and closed the wound. He says that the symptoms present then have persisted and he complains now besides his nausea and vomiting of pain about an hour after eating and he says this pain is relieved by soda but not by eating food. He says this is not the same kind of pain as he had before the operation for appendicitis. His normal weight was 172 pounds when he came under my care it was 145 pounds. He looked rather anemic and undernourished.

\* Ray examination by Dr Bromer showed the pylorus lying well toward the right the duodenal cap dilated lying in close proximity to the hepatic flexure and showing quite constant distortion and deformity. There was a tendency to hyper

peristalsis and at the end of six hours there was retention of one fourth of the barium meal in the stomach. The roentgenologist's diagnosis was a lesion about the pylorus in the first part of the duodenum pinning down the pylorus and cap.

January 28, 1921 I operated on him and found just as I had done in Case II—a callous ulcer in the descending portion of the duodenum adjacent to the pancreas (Fig. 3). There were innumerable adhesions. A posterior gastrojejunostomy was done from which the patient recovered uneventfully and when fourteen months later he had gained 30 pounds in weight and had vomited only once since the operation and then only after a heavy meal of baked beans. Two years after operation he reported he was feeling well and gaining weight. All night at times but then at others he is uncomfortable when lying in bed. Can eat anything now.

A Ray examination at this time showed no 24-hour retention, normal peristalsis, a functioning gastro-enterostomy opening but still the failure to fill of the pyloric cap.

These two patients presented identical lesions, both had been operated on previously without the true cause of their trouble having been discovered and as I say it is almost as bad to do that as to do an operation on a patient when no operation whatever is indicated.

**Case IV. Carcinomatous Ulcer on Lesser Curvature of Stomach. Excision.**—I want also to present today a man forty-five years of age an iron molder by trade who went into the hospital by Dr. H. G. Godfrey September 20, 1921, his chief complaint being pain in the stomach and vomiting. He had been operated on twenty-two years previously at the German Hospital of Philadelphia, now the Lankau Hospital for acute appendicitis with abscess. Since then he had been in good health until five or six years ago when he began to have sour eructations, belching, and much gas. He also had complained at times of acute pain in the stomach after eating. And then his vomiting became more frequent. A long time ago, in December, 1920, he vomited some blood after a severe attack of pain and unconsciousness.

ness The amount of blood lost is not known Evidently his unconsciousness was caused by hemorrhage into the stomach causing faintness and then afterward he vomited as he came to He had vomited blood only once since and thought that since these hemorrhages he had had less pain and vomiting but the belching of gas continued One week before admission he vomited a cupful of coffee grounds material and the day before admission he vomited about a quart of blood five hours after eating a meal of soft eggs bread and coffee He got very weak but did not lose consciousness this time He had been constipated for about five years and had had to take purges constantly He never passed fresh blood by the bowel but one year ago passed some black stools He said he had lost about 30 pounds in weight in the last ten months His weight on admission was 104 pounds

Except for a rather pale anemic appearance physical examination was negative but there was a small reducible incisional hernia at the lower end of the scar of the appendix operation

The red blood cells numbered 1 920 000 the hemoglobin was 38 per cent and the white blood cells 9600 of which 56 per cent were polys and 39 per cent lymphocytes

The blood Wassermann was negative as was his urine his phthalein output a few days after admission was 20 per cent for the first hour and 10 per cent for the second hour or a total of 30 per cent for the two hours

We kept him on liquid diet at first but as he grew better he took soft diet and after three weeks although he was still in bed and had considerably improved his red blood cells still numbered only 2 750 000 and his hemoglobin only 54 per cent On that day he was transfused by the citrate method by Drs Bishop and Holloway two of our interns 500 c c of blood being taken from his brother who as well as the patient was of the Type IV of Moss's classification After the transfusion the red blood cells numbered 2 890 000 and his hemoglobin as 59 per cent not a very striking change We then thought him well enough to have x ray studies made of his stomach and accordingly on October 21st the following report was re-

ceived from Dr Bromer our roentgenologist. There was a crater on the lesser curvature with a very definite outline (Fig. 4) there was interruption of peristalsis at this site but there was no six hour retention. The roentgenologist's diagnosis was an ulcer on the lesser curvature. This seemed a reasonable diagnosis for the surgeon to make also in view of the patient's history and the x-ray findings. The vomiting of bright red blood and especially the occurrence of massive hemorrhage are characteristics of ulcer rather than of carcinoma.



Fig. 4—Case IV. R. y. f. t. m. h. b. ing call. lce. lesse.  
t. E. sed. Microscop. port. Scarth. ca. m.

and the single report of vomitus consisting of coffee grounds material was not sufficient of itself to justify a diagnosis of carcinoma while the x-ray picture is quite typical of a callos ulcer.

Operation was done October 25, 1921 (during the meeting of the Clinical Congress of Surgeons) through a left epigastric paramedian incision 18 cm. long the pylorus was normal but on the lesser curvature about 5 cm. from the duodenum, just where the crater shows in the skiagraph there was a callous

ulcer The pancreas was lightly adherent to this region and there was a local hardness in the pancreas in this neighborhood Now it is well recognized by surgeons that a gastrojejunostomy alone is less suitable for ulcers in this situation than for any others and though almost all surgeons agree that it is proper to excise an ulcer of this type wherever it is situated if it is possible to do so it is almost imperative to excise an ulcer situated such as this one is high on the lesser curvature Very few ulcers in this situation will heal after the performance of a gastrojejunostomy alone Accordingly I detached the gastrohepatic omentum from the region of the ulcer and placed a pack in the lesser peritoneal cavity behind the stomach I next caught the margins of the ulcer in curved hemostats and then excised it with the cautery The wound in the stomach was closed with continuous through and through overhand sutures of chromic catgut and the row again was inverted with a seroserous suture of chromic gut Mr Moynihan states that he employs No 000 000 (6 zero) chromic catgut for all of his intestinal work but I suspect that the English scale must be different from ours in regard to catgut as well as in regard to the caliber of urethral instruments because no surgical supply house and no surgeon of whom I have inquired had ever heard in this country of catgut finer than triple zero and I am satisfied to use either double zero or triple zero for these sutures In combination with other surgeons I have abandoned the use of linen sutures even for the seroserous stitches in gastrointestinal work and have had no reason to wish to return to the linen After closure of the opening in the stomach the latter was somewhat deformed so this excision of the ulcer was supplemented by a posterior gastrojejunostomy done in the usual way Perhaps I ought to be more explicit upon this point for while I believe it ought to be the usual way I suspect that it is not the usual way in which the operation is done The jejunum normally hangs more or less vertically from its origin when the patient is upright it will swing either to the left or to the right according to the position of the patient It was long ago (in 1901) pointed out by Petersen (an assistant of Czerny) that

the most sensible way in which to anastomose the jejunum to the stomach was to turn it neither toward the left nor toward the right but to keep it as nearly as might be in the longitudinal axis of the patient's body so that when the viscera are replaced the proximal end of the jejunum corresponds to the lesser curvature of the stomach and the distal end of the jejunal opening with the greater curvature. I can see no occasion for turning the jejunum either toward the right or toward the left. The transverse mesocolon in this case was adherent to the posterior

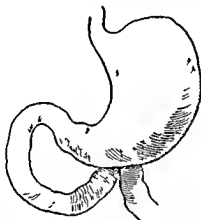


Fig. —Proper direct of jejunum posterior gastric wall of gastro-jejunal anastomosis. The jejunum hangs before the peritoneum, either to the right or to the left.

wall of the stomach except near the lesser curvature but wherever it is not adherent it is sutured to the stomach so as to prevent prolapse of the small intestine through the opening and also so as to prevent the peritoneum in the mesocolon from becoming adherent round the jejunum below the anastomosis since in that position it may cause constriction or anastomosis of the jejunum and so interfere with the proper functioning of the anastomosis. There is also no occasion to attach the jejunum to the stomach proximal and distal to the anastomosis when the opening in the stomach is made. I have adhered because there is

no tendency for the jejunum to be linked. When the viscera are returned to their normal position the jejunum lies as before the operation (Fig. 5).

This patient recovered without a single unfavorable symptom except for a slight bronchitis on the third and fourth days after operation. The laboratory report unfortunately showed that the ulcer was a scirrhus carcinoma and not as had been thought before operation a simple ulcer. His symptoms were completely relieved however and he left the hospital three weeks after operation. At the present time (fifteen months after operation) he is in fair general health with no abdominal symptoms of any kind having gained 23 pounds (10.36 kg.) in weight since leaving the hospital. Dr. Godfrey tells me however that he gives evidence of early tuberculous changes in his lungs.

**Case V Perforation of a Gastric Ulcer Followed by Carcinoma**—A young woman Mrs. Ada J. aged twenty-eight came under my care first in September 1919 complaining of dysmenorrhea which I thought was caused by anteversion of the uterus and a stenosis of the cervix. This was treated by a Dudley operation on the cervix. The abdomen was then opened and several cysts of the ovaries excised and sutured, the appendix was removed and a very redundant and mobile cecum lying in the pelvis was replaced in the right iliac fossa and fixed to the parietal peritoneum by sutures.<sup>1</sup> She came back to see me at the hospital about four months later feeling fairly well but complaining now that six weeks previously she had developed a little pain in the left side between the crest of the ilium and the margin of the ribs and saying that she had a drawing sensation over the lower left ribs. I examined her as I thought thoroughly at about 1 P. M. and could find nothing wrong with her. Her abdomen was soft and not tender. Her chest was negative and pressure over her left hypochondriac region where she complained of the drawing sensation caused

<sup>1</sup> The following is a list of the mobile mesoperitoneal glands removed and the pathological findings. The patient is Mrs. Ada J. (1906-1933).



her no discomfort. So she went home but scarcely had he arrived there when she got a sudden severe pain coming on without any notice at first only in the abdomen but in a few minutes the pain spread all over her body. She vomited several times and felt very weak and sick. She was seen at once by her physician Dr Godfrey who sent her back to the hospital with the diagnosis of perforated gastric ulcer. When I operated upon her about six hours after the perforation occurred I found a perforation about 1 cm in diameter with indurated margins on the anterior wall near the lesser curvature and about 4 cm from the cardia. This was closed and a posterior gastrojejunostomy was done. She recovered uneventfully.

x Ray examination by Dr Bromer in July 1920 six months after closure of the perforation showed an incisura on the greater curvature of the stomach with a niche on the lesser curvature which was constant throughout the entire fluoroscopic examination. No movement of the barium could be seen through the gastro-enterostomy opening. Dr Bromer said that if the ulcer had been excised at the previous operation this was undoubtedly a recurrence. If it had not been excised it was a persistence of the ulcer unhealed. She felt fairly well until November 1920 when she vomited some blood and then I urged her physician and he urged her to return to the hospital and have the ulcer excised. But during a period of nine months in 1921 she was entirely free of all gastric symptoms. Just before Christmas 1921 stomach symptoms returned and continued up until her readmission at the end of March 1922. She had taken to her bed about four weeks before this time and had been jaundiced for the last two weeks. She was extremely jaundiced and erythematous on admission her abdomen was greatly distended tense and tympanic except in the dependent portions and in the left epigastrium where there was a mass which was very tender. I thought possibly she had a chronic or subacute perforation of the ulcer with an abscess around the stomach and on March 28 1922 I operated on her. A main finding of bile stained and bloody fluid in the peritoneal cavity about 1000 c.c. being evacuated. There was a fixed mass in

the gastrohepatic omentum extending from the lesser curvature evidently a carcinoma. The stomach pylorus and duodenum were adherent to the old scar which was to the right of the present incision. The old gastroenterotomy was exposed it was not thickened and appeared to be normal. Owing to the extent of the adhesions and the hopeless nature of the condition the liver was not exposed. The patient died of exhaustion about two weeks after this operation. Autopsy showed at the lesser curvature at the cardia a carcinoma adherent to the liver numerous nodule of secondary carcinoma in both lobes of the liver the diaphragm adherent to the left lobe of the liver and invaded by carcinoma the gall bladder greatly distended and tense the common duct compressed by a retroperitoneal mass of carcinoma or by direct invasion and there was bile stained fluid in the peritoneal cavity.

This case is of interest because of the premonitory symptoms of perforation of the stomach which she presented and had we known of the existence of an ulcer of the stomach such symptoms should have put us on our guard against a threatening perforation. It is also of interest to speculate whether the primary lesion in the stomach was carcinomatous or whether the carcinoma developed in the bed of the old ulcer. Might it not have been better to have excised the ulcer at the time of the perforation?

**Case VI Result of Partial Gastrectomy for Carcinoma** - I thought it would be of interest to you in connection with the patients I have just presented to have come back today a man (Mr Ernest M) on whom I operated more than two years ago for a rather extensive carcinoma of the stomach. He was fifty five years old and until eighteen months before admission to the hospital on September 28 1920 he had been in good health but then he began to get indigestion sour stomach after eating belching up much gas and acid tasting material several hours after eating. Medicine had done him no good. Nine months before admission he began to vomit every time he ate a full meal and until he came into the care of Dr Freas

who referred him to me he was in very miserable condition. Dr. Treaswick restricted his diet to liquids and found that he could retain milk very well. He had no appetite at all, was very constipated, had lost 50 pounds in weight and was naturally very nervous and worried about himself. He had vomited some coffee-grounds material at times.

This may be considered a typical history of carcinoma of the stomach: a patient past middle life develops rather suddenly stomach symptoms which persist in spite of treatment and which continue to grow worse without any remissions or free intervals. Appetite is lost, weight is lost, while the coffee-grounds vomitus and the roentgenologic examination serve merely to confirm a diagnosis which should have been settled by exploratory operation if necessary before such late symptoms appear.

The x-ray showed a lesion involving the pylorus and the prepyloric part of the stomach and Dr. Bromer added that at the pylorus there was an accessory pocket which was constant and which he thought was probably the site of the original ulcer, the rest of the filling defect being due to the superimposed carcinomatous mass. From x-ray examination it appeared to be a suitable case for resection.

The patient's red blood cells numbered 4,120,000 and his hemoglobin was 56 per cent. His blood Wassermann was negative as was his urine.

At the operation (October 1, 1920) I found no metastases palpable in the liver, in the prepyloric region of the stomach there was a callous ulcer adherent to the head of the pancreas and extending from the greater to the lesser curvature and causing obstruction. Except for the posterior adhesions the tumor was freely movable, the size of a medium-sized apple and caused an hourglass contraction of the stomach. A partial gastrectomy, and the open end of the stomach being implanted into the antimesenteric border of the jejunum according to Polya's method. The patient recovered without unfavorable symptoms and went home three weeks after operation. Two months after his discharge he was able to return to work.

and has remained in good health since. A curious habit that he acquired after operation was a fondness for sauer kraut. He ate 2 quarts of this every day for a long period of time making four meals out of it with bread and sometimes with potatoes.



Fig 6—Specimen of stomach removed by partial gastrectomy—ill described. Specimen has been described as rva t d t ill fit m h t d d th p l gless wa b t t d d th d d m (tl ft) t d 25 m by d gr with th ct t ead dw 4 m d t t f m g th A call lce t th l se curvat wh d p t a d sely dh t t th p c (h p e f at ) th be b sect d by l g f ss rat te d g p both t d pot w l t th l se t (C VI)

He never has had noteworthy gastric or intestinal symptoms since operation and is now in very good health.

Figure 6 shows the portion of the stomach removed. You will see it has been opened along the lesser curvature. Dr C Y

At present February 1923 twenty-eight months after operation he weighs 150 pounds.



been unable to do anything after opening the abdomen and have merely closed the wound again

#### OPERATIONS FOR CANCER OF THE STOMACH

	Operated	Mortality
Exploratory	36 per cent	43 per cent
Palliative	4 per cent	50
Radical	21 per cent	25

The patient an illustration of whose specimen I show you now (Fig 7) was a woman sixty five years of age and I operated on her September 27 1921 Her chief complaint on admission was vomiting nausea and pain in the stomach Except for a hysterectomy for fibroids twenty five years previously she had never been ill Up until five or six months before operation she was not conscious of her stomach but about this time she was kicked in the abdomen by a pet dog which jumped into her lap This probably called her attention to her stomach for she now found that she developed pain when she ate that food nauseated her and caused vomiting The vomiting had gradually become worse and often she had vomited blood Lately she had been unable to retain even fluids The vomitus was frequently like coffee grounds in appearance For a long time she had had some edema of the feet headache vertigo and nocturia She had no hemorrhoids however and never passed blood by the bowels She had had no cough dyspnea or palpitation of the heart She had been very constipated and at the time of admission her bowels had not moved for a period of two weeks She had lost 34 pounds in weight in the preceding six months Her red blood cell numbered 4 150 000 and her hemoglobin was 65 per cent

On admission she looked more ill than there seemed to be any reason for Her skin mouth and lips were dried out and in the epigastrium to the right of the midline there was an indistinct mass not tender and apparently not movable For continual vomiting her stomach was washed the contents of the washing being dark blood and bile the presence of the bile indicating that she had not complete pyloric stenosis An

enema was effectual producing three good bowel movements

Four days after admission fluid having been forced into her it seemed to me that she was in fit condition for operation and I really did not expect to be able to do anything radical planning to do only a gastrojejunostomy but on opening the



Fig. 7—Port of stomach exposed (for carcinoma) high gastrojejunostomy (Case VII)

abdomen I could find no metastases in the liver and the pylorus appeared normal but on the lesser curvature of the stomach extending almost to the greater curvature and from 4 cm proximal to the pylorus almost to the cardia was a tumor mass which was freely movable. It extended so far toward the left on the greater curvature of the stomach that it seemed to me

it would have been very nearly as troublesome to do a gastro-jejunostomy as to do a gastrectomy and accordingly I selected the latter operation. The stump of the stomach was implanted into the side of the jejunum and though the patient was in very poor condition at the end of the operation the next day she was somewhat relieved after gastric lavage but the third

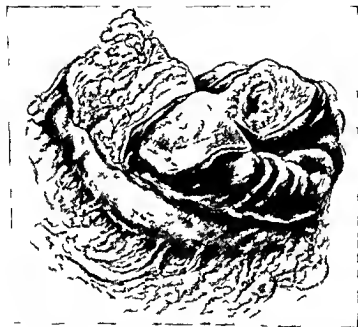


Fig 8—P t f t m h d f c m pe d p r t l y l o g  
l s s e r v a t p g l g l t d f f t h t m o t d g  
a n t s d p o t s a l l f e t m h (C VII)

day after operation she died of asthenia. I opened up the wound and found no cause in the abdominal cavity for her death. About one fourth of the stomach remained all the sutures had held firmly and I removed the specimen for preservation. I found now a secondary growth on the under surface of the right lobe of the liver far posteriorly so that even had she survived the radical operation it is not likely she would have been free



of recurrence for a very long time. The operative specimen as you see (Fig 8) shows an ulcer on the lesser curvature of the stomach nearly round with indurated and raised walls. The pyloric section is 5 cm from the margin of the ulcer but the cardiac section although it passed nearly to the esophagus



Fig 9—Sp m m dpo tm rt m l d gca d d f t m h  
 w th j j m t m sed t t pe d d N t port f great m t m  
 h g g f m great r t d pece f tra sv se m soc l t red  
 t stom h bo j j nal loop (C se VII)

is not more than 2 cm away from the margin of the ulcer. You know it is much more important to get a large free margin on the cardiac side of the carcinoma than on the duodenal side because the cancer cells as has been proved microscopically invariably tend to grow toward the cardiac side than toward the duodenum. The specimen removed peritomeum (Fig 9)

shows the stump of the stomach implanted into the antimesenteric border of the first coil of the jejunum which was brought up through the transverse mesocolon according to Polya's method. Though we currently speak of this anastomosis as Polya's method because it was popularized by Polya in 1911 and brought prominently to the attention of surgeons in this country by Mayo in 1914 yet I think it is interesting to recall that as early as 1898 Mikulicz stated that he preferred to all others this method of terminating the operation of gastrectomy.

In conclusion I would have you bear in mind (1) that it is important not to do such an operation as gastrojejunostomy unless there is a clear indication for it (Case I) (2) to make thorough enough search to make sure that the true lesion is not overlooked (Cases II and III) (3) to excise chronic gastric (and duodenal) ulcers whenever accessible because some of them are carcinomatous (Cases IV and V) and (4) that if we are to hope to secure permanent cures in cases of frank gastric carcinoma (Case VI) it is necessary to attempt radical operation in borderline cases even if to do so brings us a high primary mortality (Case VII).



## CLINIC OF DR T TURNER THOMAS

NORTHEASTERN AND PHILADELPHIA GENERAL HOSPITALS

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### OPERATION ON STRANGULATED INGUINAL HERNIA IN THE PRESENCE OF AN OVERLYING SUPPURATING BUBO AND SEVERE INFLAMMATION OF THE SURROUNDING SKIN AND SUBCUTANEOUS TISSUE WITH RECOVERY

THIS man is seventy years old a clerk. He is slender but has always enjoyed good health and has good color and nutrition for his age. When a boy he developed a small inguinal hernia on the right side which never became larger than a hickory nut. About thirty five years ago he developed a left inguinal hernia and soon afterward began to wear a truss for both herniae. For a number of years there has been no visible evidence of a right hernia. He never wore the truss at night when the left hernia would come down occasionally but it could always be reduced easily until July 7 1922. About 10 30 P M on that day while at his bungalow in the country it began to cause pain and could not be reduced. About 10 30 on the following morning a physician came in and after about forty five minutes manipulation accomplished reduction. He tightened the truss posteriorly by pulling the strap up one hole at the buckle to retain the hernia more securely and advised the patient to wear the truss continuously. Within a week there was chafing of the skin at the site of the hernial pad and the patient on his return to his home in the city feared to remove the truss. Gradually an inflamed mass developed with one or more softened lymph nodes within it. On August 31st last his physician Dr William H Annesley was called because the pressure pain prevented the wearing of the truss any longer. The patient was kept in bed to favor retention of the hernia without the truss. On the night of



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September 1st much pain developed in the region of the hernia and tended to diffuse itself throughout the abdomen nausea and vomiting also setting in. I saw the patient first about noon on September 2d. The pain was said to have moderated but there was slight distention tenderness and rigidity of the abdomen. There was a well-developed diffuse suppurative bubo just external to the external inguinal ring and beyond this area a number of boil or pimple-like infected skin glands indicating a tendency of the infection to spread about. The severe pain of the night before and the persistent nausea suggested strangulation of the hernia. Palpation of the external ring by invagination of the scrotum disclosed a hernial protrusion about the size of a hen's egg which could not be reduced and was painful on pressure in addition to the general pain in this region. Operation was advised notwithstanding the overlying suppurative infection because an unrelieved strangulation was a greater risk than that of peritonitis from operation through such an infected tissue.

The ambulance was summoned and the patient transported to the Northeastern Hospital and the operation begun at about 2 P. M. After having the skin with the patient under ether the region above the infected area was cleaned first with ether then swabbed with tincture of iodine and this washed off with alcohol. A sterile towel was then made to cover the infected skin and its upper margin clamped to the skin about an inch above the highest infected pimple or boil and this margin of the towel directed about parallel with Poupart's ligament. After draping the patient with sterile sheets and towels in the usual manner an incision about 6 inches long was made in a line with the fibers of the external oblique about 3 inches above Poupart's ligament (See *Case No. F-10*). The wound was immediately protected from the surrounding infected skin by clamping sterile towels to the wound margins above and below. After cutting through the external oblique the lower margin of flap was separated from the underlying internal oblique and retracted strongly downward. This retraction was made more easily by a firm elastic insertion of this in

cision downward in front of the rectus muscle. The internal oblique and transversalis muscles and the peritoneum were divided just above the hernial mass and the mouth of the sac exposed from the inside. It was at about the usual site of the internal ring and the deep epigastric vessels were found immediately to its inner side. These were divided between ligatures



Fig 10—Hernia sac above 3 h bo P part ligam t  
Sca f m h l g f pp t g b bo D k d b l w f m d  
bo d t m l t l t t sca bo t po d t th fil t d by  
fect

The hernial sac was then cut open from the inside on a grooved director and found to contain a single loop of small intestine which was withdrawn. It was dark in color especially at its free end which was black. Later it regained a very good circulation and color. The sac was removed the peritoneal opening closed by a catgut suture and the hernial repair completed practically as in the Bassini operation. Before closing the skin



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The ambulance was summoned and the patient transported to the Northeastern Hospital and the operation begun at about 7 P. M. After shaving the skin with the patient under ether the region above the infected area was cleaned first with ether then swabbed with tincture of iodine and this washed off with alcohol. A sterile towel was then made tight over the infected skin and the upper margin clamped to the skin about an inch above the highest infected purple boil and this margin of the towel directed about parallel with Poupart's ligament. After draping the patient with sterile sheets and towels in the usual manner an incision about 6 inches long was made in a line with the fibres of the external oblique about 3 inches above Poupart's ligament (See also in Fig. 10). The wound was immediately further protected from the surrounding infected skin by clamping sterile towels to the wound margins above and below. After cutting through the external oblique the lower margin was flipped upwards and the underlying internal oblique and retracted on the downward. This retraction was made more easily by dividing the circular rotation of this in-

## HIGH APPENDIX AND MODIFIED MCBURNEY INCISION FOR ITS REMOVAL

A MAN fifty five years old has been a railroad clerk since his leg was amputated twenty five years ago. He is a large man slightly corpulent but in good health being a moderate smoker and previously a user of alcohol in moderation. He was admitted to the Northeastern Hospital October 23 1922 with severe pain in the right side of the abdomen. Two weeks before he complained of acute abdominal pain which he attributed to indigestion and constipation and which disappeared in a day or two without medical attention. About 5 A M on the day of admission he was again seized with a similar pain severe enough to double him up. He ate a light breakfast but vomited soon afterward this being followed by a weak spell and perspiration. He walked into the hospital at 7 30 A M with difficulty and apparently in very severe pain. He exhibited marked tenderness and rigidity on the right side of the abdomen.

Operation on the same day at 1 P M through a McBurney incision. On attempting to locate the cecum a vertical portion of large intestine was found at about the usual site of the cecum and ascending colon and its hands traced downward without locating the cecum or appendix. The persistent efforts to locate the appendix by the palpating fingers were unsuccessful. It was then decided that the exposed portion of large bowel was the right limb of a curved transverse colon but the McBurney incision did not permit one to follow it far up to expose the cecum. The McBurney was enlarged by extending upward from its inner end an incision through the anterior layer of the rectus sheath about 3 or 4 inches the rectus muscle was then pushed inward and the posterior layer of the rectus sheath and peritoneum was incised in a similar manner. Retraction of the margins of this wound permitted exposure of the cecum

wound because of the badly infected surrounding skin surface and the consequent danger of peritonitis the unclosed subcutaneous portion of the wound was swabbed out first with tincture of iodine and then with alcohol. Complete closure of the wound was done a sterile gauze dressing sealed with collodion applied and this covered by a thicker gauze dressing and adhesive plaster strips to support the wound. The pus and necrotic tissue of the bubo were then curetted and the cavity swabbed with tincture of iodine and alcohol and dressed.

On 9/11/22 it was noted that the temperature pulse and respiration had remained normal since the operation until the day before when the temperature rose to 100.5 F and the pulse 80. The dressings were removed on this day for the first time since the operation. Pus was exuding from the wound the margins of which showed none of the local signs of inflammation. The skin sutures were removed and the wound gaped slightly.

On 9/18/22 there was slight necrosis of the wound margins and some in the depth of the wound. There is some reason to suspect that the tincture of iodine was at least partly responsible for this necrosis. The patient was discharged 9/25 to have his wound dressed at home. It was completely healed by 10/26 and he has had no further trouble since. He no longer wears a truss on this side for the hernia.

## OBSTRUCTION OF CYSTIC BILE DUCT BY ENLARGED LYMPH NODE

THIS patient an Italian barber thirty three years old was admitted to the Northeastern Hospital on December 14 1922. He cannot speak English well and the exact history of the pre-operative developments is very difficult to obtain. On admission he had severe abdominal pain particularly in the right hypogastrium with very acute tenderness and marked rigidity and there was a marked sense of resistance suggesting a mass in the region of the gall bladder. He says that about five weeks before admission for the first time he began to have abdominal pain which has continued ever since with some remissions but a tendency to increase in severity. He managed to keep at his work more or less until about two weeks ago. He said the pain was always aggravated after eating a meal. Occasionally he had nausea and vomiting. He drank alcohol heavily until about two years ago. Now shows slight jaundice especially in the conjunctiva and is anxious for an operation on account of the long continued severe pain.

Operation December 15th. A right rectus incision about 6 inches long was made and on retracting its margins the gall bladder tensely filled projected from the lower margin of the liver  $2\frac{1}{2}$  to 3 inches against the anterior abdominal wall. It was surrounded by an adherent omentum around its whole border and underneath. Its walls were thickened and had a pinkish inflamed color. The severe pain the tension in the gall bladder and its color suggested the possibility of pus so that the abdomen was packed off with gauze pads and the contents drawn off through a trocar and cannula. This was a mucopus with no evidence of bile in it which indicated a complete obstruction of the cystic duct the common cause of which is a gall stone impaction. Palpation showed much inflammatory thickening of the whole gall bladder which was very

which was at about the level of the hepatic flexure of the colon. The appendix was seen entirely retroperitoneal directed outward and downward toward the anterior superior spine of the ileum. At its tip the appendix was covered with peritoneum on its sides but did not have a mesentery. In the rest of its extent it was covered by peritoneum only on its anterior surface. It was lifted enough to get a hemostat under it clamped and freed in the usual manner when it was removed and the stump invaginated as usual.

The posterior incision in the rectus sheath and peritoneum was sutured by chromic gut the rectus muscle then being allowed to fall back into its normal situation over the repaired posterior sheath and the anterior incision in the rectus sheath was sutured in a similar manner thus reducing the large abdominal incision to the original McBurney which was then closed in the usual manner. On October 29th it was noted that the course had been uneventful except for some tympanites which disappeared largely with the first bowel movement on the fourth day. He was discharged at the end of three weeks and has had no trouble since.

## OBSTRUCTION OF CYSTIC BILE DUCT BY ENLARGED LYMPH NODE

THIS patient an Italian barber thirty three years old was admitted to the Northeastern Hospital on December 14 1922. He cannot speak English well and the exact history of the pre-operative developments is very difficult to obtain. On admission he had severe abdominal pain particularly in the right hypogastrium with very acute tenderness and marked rigidity and there was a marked sense of resistance suggesting a mass in the region of the gall bladder. He says that about five weeks before admission for the first time he began to have abdominal pain which has continued ever since with some remissions but a tendency to increase in severity. He managed to keep at his work more or less until about two weeks ago. He said the pain was always aggravated after eating a meal. Occasionally he had nausea and vomiting. He drank alcohol heavily until about two years ago. Now shows slight jaundice especially in the conjunctiva and is anxious for an operation on account of the long continued severe pain.

Operation December 15th. A right rectus incision about 6 inches long was made and on retracting its margins the gall bladder tensely filled projected from the lower margin of the liver 2 to 3 inches against the anterior abdominal wall. It was surrounded by an adherent omentum around its whole border and underneath. Its walls were thickened and had a pinkish inflamed color. The severe pain the tension in the gall bladder and its color suggested the possibility of pus so that the abdomen was packed off with gauze pads and the contents drawn off through a trocar and cannula. This was a mucopus with no evidence of bile in it which indicated a complete obstruction of the cystic duct the common cause of which is a gall stone impaction. Palpation showed much inflammatory thickening of the whole gall bladder which was very

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suddenly and markedly. On what was apparently the upper surface of the cystic duct was an enlarged and indurated lymph node very closely and very firmly adherent to the dilated cystic duct. The constriction seems to have been immediately underneath almost the whole of the gland. The section of the duct

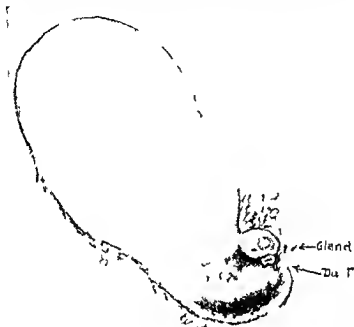


Fig 11—N t h w th w d d l t t f th y t d ct b g mm  
d t ly d t l t th mp sed t d mal port f th d ct The  
gla d el d d mp seed th port f th d t t m l t th sect n  
wh h f r m d th l gat d t mp

was underneath this gland as well as the ligated portion of the duct which was not removed (Fig 11). That the gland produced the obstruction is indicated by the fact that absolutely no visible sign of a stone or bile was found that the gland was lying on and closely adhered to the duct and that the constriction was clearly underneath the gland. This is the nearest



marked in the region of the foramen of Winslow and gastro-hepatic omentum. This indurated irregular thickening involved the cystic, hepatic and common ducts but palpation could not detect evidence of a gall stone anywhere. An effort was made to reach the neck of the gall bladder by the finger inside the gall bladder but without finding a stone. Because of the purulent contents and because it had been expected that an obstructing stone would be found and removed it had been intended that cholecystostomy would be performed for drainage but the complete obstruction of the cystic duct would permit no drainage except of the gall bladder which if left in must have resulted in a more or less permanent suppurative sinus. Only a cholecystectomy would meet the indications but to enucleate the gall bladder and cystic duct from this indurated and extensive inflammatory mass looked like a dangerous procedure especially when it came to locating and dividing the cystic duct and artery. As there seemed nothing else to do it was begun in the usual manner the thickened fibrous layer being incised about an inch from the liver attachment all around. A line of cleavage was soon obtained and the enucleation proved to be very much easier than anticipated even to the isolation of the cystic duct which was very large and irregularly dilated back of the constricted portion. This constricted portion with the cystic artery was clamped by an artery forceps and divided.

When the gall bladder was removed the most interesting phase of the case presented itself and it was for this that the case is here presented. There had been very little in the history to justify the diagnosis of gall stones. Thirty three years was an early age for this condition. The patient had never had an attack of pain in the abdomen before and he was not fat. Usually in such gall bladders one or more stones are found as well as considerable bile. Here there was no gall stone and the fluid content showed no visible evidence of bile. When the specimen was examined it was seen that the cystic duct had been cut across just proximal to the dilated portion that is at the site of the obstruction. It was of normal caliber at the site of section and almost immediately to the gall bladder side of this it dilated

## A CONGENITAL INFANTILE INGUINAL HERNIA

A MAN forty two years old on December 1, 1922 was admitted to the ward of the Philadelphia General Hospital. He was intoxicated, was in delirium and had hallucinations but quieted down within forty eight hours. On 12/15/22 it is noted that he has been up and about the ward for two days. He says that he feels good and declines to be discharged until he has had his hernia (left inguinal) operated on. He was transferred to the surgical ward on that day. This patient has a good physique but is a chronic alcoholic and a heavy cigarette smoker. His heart and lungs are negative. He says he often gets nervous spells especially after drinking and his hands tremble.

In May 1918 while in the Army after some heavy lifting he first observed pain in his left inguinal region. Operation was recommended but declined. He has worn a truss since July 1918 but has continued to have considerable discomfort and at times much pain as the result of the hernia. Abdominal cramps came on frequently and caused vomiting. He had before admission on 12/6/22 his most severe attack which lasted ten hours and was associated with nausea, vomiting and abdominal pain which he said was almost unbearable. This decided him to come to the hospital for operation. His hernia was indirect and complete.

Operation 12/18/22. The usual incision was made for a Bassini operation and the cord exposed. When this was examined a narrow sac was discovered and opened. It was easily large enough to admit the index finger which could not be passed upward inside the sac into the abdominal cavity but stopped abruptly about the internal ring. The finger carried downward in this sac found itself in contact with the testicle. We evidently had here a tunica vaginalis extending with a wide lumen up to the internal ring or a vaginal process of peritoneum which had

that I have ever come to obtaining demonstrable evidence that an enlarged lymph node can completely obstruct the cystic duct. The patient left the hospital at the end of six weeks with a very free purulent discharge from the drainage opening. On March 1st the drainage was very slight and the prospects were for a complete disappearance of his symptoms.

## POSTERIOR DISLOCATION OF THE SHOULDER JOINT WITH OBSTETRIC PALSY

THIS case is of special interest in connection with the recent very interesting paper of T. Wm. Tate Todd (Annals of Surgery July 1922) on a study of the skeleton of 730 bodies in the dissecting room among which he found 3 skeletons with this shoulder condition 2 of them bilateral and 1 unilateral or 4 abnormal shoulder joints. Important as the effort is to establish the genuineness of the specimens and brief as the space here for its discussion I would question Todd's conclusions. I would prefer to believe that these specimens are examples of postnatal subacromial dislocations with a wearing away of the glenoid posteriorly by the long continued pressure of the dislocated humeral head. Todd says of one of the specimens that its bilateral nature precluded the possibility of its being considered other than congenital. I have had one bilateral case of recurrent posterior dislocation resulting from epileptic convulsions and the displacement was of about the same mild grade as in the common congenital variety. The tilting of the acromion described by Todd more than anything else would in my opinion exclude these specimens from the congenital class. Todd says that the acromion was more tilted than usual and had its dorsal edge on a much lower plane than its ventral margin. Instead of an exaggeration of the normal obliquity of the acromion it is reversed in the congenital variety and instead of the dorsal edge being on a much lower plane than the ventral the ventral is usually on a much lower plane than the dorsal. I believe this is due to abnormal pressure on the upper surface of the antero-external portion of the acromion by the bony maternal pelvis during delivery. In this case although this depressed cartilaginous anterior portion was elevated at operation the anterior margin of the acromion is still lower than the posterior or dorsal edge. We have however in this case a confirmation of the very important points emphasized by Todd that these

closed only at the internal ring. A hernia could not have entered this peritoneal sac and as he had shown a hernia before operation a search was made for another sac. This was discovered behind the cord and was opened. It had a moderately wide lumen extending about 3 inches downward from the internal ring. In stripping it up from the surrounding fat it seemed to extend in the form of a cord down into the scrotum. With a little difficulty a curved Kelly artery forceps was introduced into this narrower portion of the sac its whole length which was for about 3 or 4 inches below the larger portion already described. The wall of this narrower portion seemed to be cicatricially thickened but somewhat irregular in course and caliber and required considerable dissection to free it after which it was ligated at the internal ring and removed the regular Bassini operation being complete. The excess of the vaginal process of peritoneum was also removed. The healing was uneventful.

The most important feature of this case was that we were dealing here with what we have long known as an infantile congenital inguinal hernia in which one must cut through three layers of peritoneum before reaching the hernial contents. There are probably few surgical conditions more thoroughly studied anatomically than inguinal hernia probably in the days when there were not many surgical conditions to study. Later generations of medical students have been compelled to study and learn many of these overdeveloped anatomic studies because of these early efforts. The writer had long thought that this special variety of hernia might be classed among the surgical curiosities but this is the second case of the kind which he has seen.

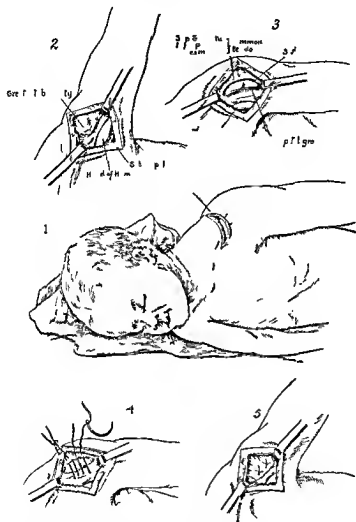


Fig 12—Illustrations of the five types of incision formed by writer 1  
 1. Incision between the glenoid and the humeral head, fascia divided 2  
 Dissection of the capsule and joint capsule, the attachment of  
 the ligamentum teres is removed, the great vessels are divided 3  
 Dissection of the humeral head, the great vessels are divided 4  
 Dissection of the humeral head, the great vessels are divided 5  
 Overlapping of the humeral head and the great vessels, the incision is closed and maintained  
 in the position of the humeral head

congenital dislocations are rarely if ever fully reduced by the operations done for this purpose

Todd says this is because the glenoid cavity is set further back than in the normal and that we are dealing here with an apparent not a real dislocation. I have done a fair number of operations to accomplish reduction in these cases but I doubt whether I have ever been successful although I have never done an operation which was afterward regretted by myself the patient or relatives of the patient. The improvement in motion is always very satisfactory. In this case the dislocation persists and is perhaps slightly greater than before the operation but the range of motion and power of the limb are almost as good in the affected as in the normal limb.

I saw and examined this patient first on March 3 1916. He was a boy four months old. The head presented and he weighed 10½ pounds at birth. The chief difficulty was in delivering the shoulder especially the left the doctor finding it necessary to hook his finger under the axilla and pull on this the left side. He thought that he must have dislocated the shoulder. Paralysis of the left arm was not noticed until three days after birth when it was complete except for slight movement of the fingers. Examination now (March 3 1916) shows a posterior subluxation of the left shoulder joint with a characteristic marked internal rotation of the whole limb and with marked limitation of passive abduction and external rotation at the shoulder. There is slight limitation of passive extension and flexion at the elbow and slight cubitus varus deformity an elbow condition commonly associated with these birth palsies.

The child voluntarily elevates the arm forward to a little above a right angle with the body. During the examination of the shoulder movements a click was obtained and immediately afterward the child began to cry. The mother says that the child often cried when pressure was made in the left axilla which tends to show that most trauma occurred about this joint.

Operation March 17 1916. Incision around the margin of the acromion through the deltoid (Fig. 12 No. 1). The typically



Fig 13—A h. breadth m. th. th. limitat. f. bd. t. nd  
 ext. rnal. tat. t. th. g. th. pat. t. bef. perat. d. B. the  
 us. l. ext. p. o. t. f. t. perat. C. h. w. th. pat. t. h. r. ported. t.  
 the. p. t. t. m. w. th. the. m. t. th. d. N. t. th. ch. ged. co. t. ur. f.  
 th. f. ct. d. l. f. t. h. uld. compared with th. rnal. ght. h. uld. D.  
 hows. rnal. levat. d. p. nat. of. l. f. t. m. w. th. t. b. rnal. move.  
 ment. f. scap. la.

slightly shorter than the other and the dislocation is probably slightly more marked than before operation. This is probably



bent down anterior portion of the acromion which is cartilaginous was lifted up toward its normal level as far as possible and left in this condition. The subscapularis tendon was divided completely at its insertion into the lesser tuberosity to allow as full external rotation as possible (Fig. 12 No. 2). This also permitted about full abduction. To maintain the external rotation the external rotator tendons were divided at their insertions into the greater tuberosity (Fig. 12 No. 3) and the divided ends fixed as far forward as possible on the surface of the greater tuberosity by two catgut sutures (Fig. 12 Nos. 4 and 5). The cut deltoid margins were reunited by a continuous catgut suture with some difficulty owing to the necessity of keeping the arm in abduction and external rotation to prevent breaking the sutures holding the cut external rotator tendons forward on the greater tuberosity. A continuous catgut suture closed the skin wound completely, a sterile dressing was applied and a plaster cast maintaining the arm in as nearly full abduction and external rotation as possible (Fig. 13 B). Primary healing occurred and the patient was taken home with the arm in a cast on March 27, 1916. The cast was removed April 16th and the arm came down to about 140 degrees. The divided cast was then reapplied for support of the arm. On March 23d it came down to about 60 degrees when the child was in the upright position. The mother said that he moved the arm up and down from the original cast position to the limit of 60 degrees easily and freely while in the recumbent position.

April 30th the arm came down almost to the side of the trunk. October 20, 1916 the mother says she can see scarcely any difference in the active and passive movements of the two arms.

September 11, 1919. There is a very slight limitation of abduction and external rotation. The affected arm seems to be just as strong as the other but he does not use it quite as freely as the other.

December 28, 1922. The mother and the patient both say that they see practically no difference in the use of the two arms (Fig. 13 C and D) although the affected arm is still

## COMPOUND DOUBLE FRACTURE OF THE LEG WITH PRIMARY CLOSURE

THIS case although its course has not yet been completed is discussed here because its progress thus far has been sufficiently interesting to justify it. To appreciate the facts in this case it will be necessary to make brief reference to a paper which appeared in the Journal of the American Medical Association August 5 1927. In that paper the position was taken that most compound fractures were due to indirect violence and consequently the compounding skin wound to protrusion of the sharp fragment end. According to this view there was no infection in the wound except in so far as the usual briefly protruding fragment gathered infection from contact with surrounding objects as clothes and carried it back into the wound. It was assumed that in such cases thorough swabbing of the wound with tincture of iodine followed by alcohol would destroy such infection.

Thirteen cases were reported in which the wound in each was closed without drainage and in the later cases completely covered by a plaster cast. In some an extension cast was applied to adjust and fix the fragments and in others plates and screws and plaster cast were employed. The 13 cases reported may be divided very crudely into two groups: in the first 6 the cast did not cover the wound which could be and was exposed early. In the remaining 7 the wound was completely covered by the cast and in no case was the cast removed sooner than two weeks after its application; in one case 9 weeks afterward. In 3 of the first group primary healing was obtained and in 3 secondary healing; in 2 of the second group primary healing and in 5 secondary healing. One of the outstanding phases is that in the 3 of the first group healing secondarily there was very little evidence of infection but the slight quantity of pus burrowed deeply and slowly and small pieces of dead

due to the humeral head working itself backward into a position where it is less confined under the deformed acromion and more free to act. I have seen this occur in other cases after operation always to the advantage of the patient in increased motion.

was now first discovered that there were two nearly transverse lines of fracture isolating a fragment of the tibia 3 to 4 inches long displaced markedly inward with considerable deformity at each end. The adjustment was difficult and prolonged and resulted finally in the complete detachment of this isolated fragment. Of course this complicated matters very much and raised the question as to what to do with this fragment—leave it out or replace it. If infection set in it could not in all probability regain attachment to the surrounding tissues without which it could not live. In the latter case the resultant bone defect would be difficult to fill in. It was decided to retain the fragment and fit it in position which was accomplished after much difficulty and all three fragments fixed by a Lane plate having eight screw holes the two medial holes and screws being used for the middle fragment and three each for the other two fragments. The most difficult problem in the open treatment of fractures is in my opinion not that of infection but of immovable fixation of the fragments. Movements of the fragment ends on each other is the most important factor with the usual aseptic technic in starting trouble in the wound. For this reason ordinary wood screws on account of the length of the screw and the depth of the thread were employed and were made to pass through the whole thickness of bone and take firm hold of both layers of compact bone (Fig 14). The wound was now swabbed out with dichloramun T and closed without drainage with a continuous No 2 chromic gut suture. Sterile gauze moistened with alcohol was applied and bandaged and a plaster cast from the middle of the thigh to and including the foot without any opening in it.

On 8/9 it was noted there had been no local or constitutional signs of infection since operation.

On 8/21 there had been no complaint of pain and no other local or constitutional symptoms of infection but because of concern about the fate of the detached fragment the wound was exposed through a cast opening. The gauze was saturated with a discharge that was more serous than purulent and both wound margins about over the detached fragment were under

bone were discharged from time to time. In the secondary healing cases of the second group there was no burrowing of pus and no equestrum of dead bone discharged. In presenting this case no space will be taken up with any attempt to explain what happened but merely to relate it.

The most interesting of the 13 cases already reported was one in which discharge resembling pus occurred but with no local or constitutional signs of infection. The small area of denuded bone presenting in the wound was expected later to undergo necrosis and sequestration but became completely covered by healthy granulation which healed over without any evidence of sequestration. This new case is now presented in its incomplete stage chiefly because its progress is in many respects related to the one just referred to.

On August 5, 1922 a nineteen year-old mill hand sustained a compound fracture of the leg below the middle in an automobile accident. I was present when he was brought into the receiving ward of the Northeastern Hospital and saw the leg as soon as it was exposed. It was smeared over with blood and dirt and there was a transverse wound about 2 inch long bleeding freely. It was still at the seat of fracture that is buckled up easily. Posteriorly there was another small skin wound on about the same level as the first and was probably due to a protruding fibular fragment as the anterior wound was probably due to a tibial fragment. About an hour later recovery from shock seemed to be sufficient to justify operation which was proceeded with without waiting for an x ray. Later developments showed that an x ray would have been antagonistic.

The leg was shaved, washed with tincture of green soap and sterile water and dried. The whole leg was then painted with tincture of iodine, this washed off with alcohol and the field of operation draped by sterile sheets and towels in the usual manner. The interior of the wound was then swabbed out thoroughly by tincture of iodine on a gauze pad in the grasp of an artery forceps and the iodine followed by alcohol. A longitudinal incision about 8 inches long was made over the tibia through the compounding wound exposing the fragments. It



going necrosis out to the line of sutures on each side where the necrosis stopped sharply. The plate was visible at one point but there was no evidence of infection in the surrounding skin or deeper tissues. Very little moisture remained in the



Fig. 14—The right side of the wound was passed through the whole body. The right side of the wound was held so that the right side was necessary and the left side was held. A rigid plate was desired but it was not available.

wound after removal of the dressing that is the gauze had soaked it up practically entirely. Sterile gauze moistened with dichloram T was applied and covered with more gauze and a bandage.

On 8/26 wound again exposed dressing moist and the e

These quotations from the postoperative notes will answer largely for all those taken. Until a few weeks ago dressings were done about once a week the interval never being less than five days sometimes as long as nine days convenience being chiefly responsible for the difference. In the longer period an odor would develop. The dangers of infection have given little or no concern the vitality of the isolated fragment being the disturbing question. Outstanding features of the case have been the absence of the usual signs of infection and of real pus. There has been no evidence of pus developing around or under the fragments or at the lines of fracture which are filled with granulation tissue. It is now almost seven months since the accident and operation and there has yet to appear the slightest evidence of loosening of pieces of dead bone. In one of the early dressings a small piece of detached bone came out in the gauze but this had clearly been detached in the accident. Granulation tissue has long filled in the visible drill holes of the upper and lower fragments and the lines of fracture especially the lower line of fracture where it is abundant. It has appeared at the upper of the two drill holes in the medial fragment. One of the most interesting observations is that granulation tissue is slowly growing over the previously denuded portions of the upper and lower fragments especially the lower and these granulations are becoming adherent to the bone surface. This is shown when one tries to lift them from the bone with a probe. There is really some question as to whether these granulations are growing out of the bone or are growing from the surrounding soft tissues and becoming adherent to the bone (Fig. 17).

Is the middle fragment living? I think it is but with poorer nutrition than the two main fragments. The poor nutrition is shown by the failure of the drill holes to become filled with granulations and failure of granulations to grow over this fragment from the sides or to grow out of it as in the other two fragments. That it is alive is shown by the failure of pus to develop under and around it or at the lines of fracture which are filled by granulation tissue the difficulty of moving this fragment



area of all three fragments is denuded of periosteum and has the usual grayish appearance suggesting that superficial necrosis and sequestration will be likely to occur later. There



Fig 16—Ant post po film th l th cond t d  
operat Th d ty xt ra l ma gm d ce ral ca y ar bo t as  
def t in th m dd in th th t f gm N r th r d ve f  
call in th and Fig 1 N call ca be d t t d by th p be ther  
lin f fract

are no local or constitutional signs of infection except the already mentioned necrotic tissue and the discharge. The patient can move the fragments to either within the cast but not on each other. Dicho mm T d ssing

## CLINIC OF DR. JOHN H. JOPSON

### PRESBYTERIAN HOSPITAL

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#### CARBUNCLE OF BACK OF NECK. EXCISION OF CARBUNCLE BY THE ELECTROCAUTERY KNIFE FOLLOWED BY CARREL DAKIN TREATMENT OF WOUND

NEARLY every year we have on our service at the Presbyterian Hospital several cases of carbuncle admitted to the wards. Our proximity to several homes for old people who refer to us their patients explains the rather unusual number of these cases which we see especially during the winter. Recently we had 4 cases of carbuncle in the ward at the same time. In none of them was diabetes the underlying cause. The present case is a fair example of the more severe type. He is sixty eight years of age, an inmate of the Old Man's Home and is a sturdy old gentleman otherwise in good health. Duration of the carbuncle is three weeks. When admitted (January 21 1923) he was suffering great pain, was unable to sleep and showed a carbuncle situated on the nape of the neck with induration extending laterally from ear to ear and as high in the scalp as the crown. The central area showed a number of small discrete sloughing openings. The temperature was but slightly elevated 99½ to 100½ F. He had a leukocyte count of 18 000.

For some time we have been in the habit of excising the affected area including all of the openings of the carbuncle and the underlying infected and infiltrated connective and fatty tissue with the electrocautery knife. This method was brought to our attention by Dr. A. C. Scott of Temple, Texas, who has found it efficient in quite a large series of cases of carbuncle. Dr. Scott is also enthusiastic in the use of the same method for the radical excision of malignant disease in which field we have not followed his recommendations. In cases in which we have used it for the excision of carbuncles it has justified the claims which Scott makes for the method, but for which he does not

by pressure on or grasping it with forceps and the absence of any signs of sequestration after nearly seven months point in the same direction. The best evidence however is in the x ray which seems to show that the middle fragment is alive and that callus is uniting it to the other two fragments (Figs 15 16).

January 6 1923 Patient has been walking on the cast about ten days. With a good light both lines of fracture were observed closely as he successively took the weight and released



Fig 17—Appearance of different parts of fracture separated from each other. The middle fragment almost black and entirely bare can be seen. The upper and lower fragments are covered by granulation tissue.

it as in walking. All fragments moved up and down to ether without any motion on each other at the fracture lines.

February 26 1923 Cast removed today. Wound healed almost to the margins of the middle fragment the surface of which is still completely uncovered by granulation tissue. Very little wound discharge and none coming from the fracture lines or from the depths around the fragments. The x ray taken today shows clearly a thicker line of callus extending along the middle fragment from the upper to the lower one. Manipulation of the leg seems to show firm union and the cast is not to be reapplied.

excision included the underlying area of slough which was dissected out with the cautery knife *en bloc* to the deep fascia. The surrounding flaps were then elevated by point dissection with the hot knife opening up outlying pus pockets which sizzled and steamed as they were evacuated. When all the infected area had been penetrated and drained which was accomplished without hemorrhage the wound was packed with strips of gauze saturated in Dakin solution. The pain was relieved almost immediately and the temperature promptly declined to normal. The Dakin



Fig 19—Arrangement of tubes for Dakinization

tubes were inserted on the second day and systematic irrigation of the wound begun. He is still in the hospital after two weeks.

The illustration shows the method of Dakinization (Fig 19). There is less tendency for the circular tubes to be displaced than where we use two or three straight tubes for the irrigation as is the usual custom. My house surgeon Dr Cooper made this particular one.

Another illustration shows the appearance of another carbuncle after operation in a case in the ward at the same time and operated on a few days before the first by my associate

claim on invalidity as it is a method of treatment which has been occasionally used for a number of years. It has the advantage over knife excision in that it is not attended by hemorrhage which otherwise may be severe; that it sterilizes the infected area which it traverses and temporarily seals up the blood vessel and channel surrounding the area excised. It permits of the excision of large carbuncles in debilitated patients with a minimum of shock. We have observed that as Scott remarks the



Fig. 18.—Appearance of right side of face of D. K. Smith. The dressing and rat has been removed. Some discharge remains.

pain is almost immediately controlled after such cautery excision. There is a very limited sloughing of the large cauterized and sterilized wound surface which remains. Such slough as adheres to the wound yields quickly to Dakinization and if desired healing can be hastened by the early application of skin grafts (Fig. 18). In this case cautery excision was practised and a skin area about  $2\frac{1}{2}$  inches in diameter was removed including practically all of the necrotic and purpuric skin tissue. This

## CARCINOMA OF THE TRANSVERSE COLON    INTESTINAL OBSTRUCTION    OPERATION IN SEVERAL STAGES BY THE MIKULICZ METHOD

H B WHITE female aged sixty two years    Had been well until one year ago when she began to have indigestion in the shape of vague pains and discomfort in the epigastrium at times sharp at other times dull and aching. These attacks were irregular as to time separated by days or weeks and bore no relationship to her meals. She had gaseous eructations which gave her some relief and a burning sensation in the upper abdomen but never vomited and the bowels were not constipated although at times she described the movements as explosive. These also gave her relief and she expelled considerable flatus. Her weight and general nutrition were well maintained and she was otherwise in fair health. These symptoms have persisted and increased in severity. One week before admission the pain became very severe starting in the region of the umbilicus and radiating to the right lower abdomen. She was nauseated and vomited a bilious material. During the three days preceding admission the pains progressed in frequency were intermittent sharp and cramp like and she described the feeling to be as if the intestines were rolling into a knot in the right lower quadrant. The bowels moved daily until the day of admission when enemas were given but only gas was expelled.

The history was quite characteristic of an obstruction of gradual development and probably of malignant origin. When examined on the day of admission (December 7 1922) the patient was in good condition moderately distended and with some abdominal rigidity. She was well nourished somewhat anemic but exhibited no cachexia. During the examination she had one of the cramp-like attacks and the peristaltic wave could be seen to roll across the abdomen from left to right into the iliac region with a very marked distention of the affected coil of bowel. Immediate operation was decided upon. The probable

Dr. Damon B. Pfeiffer (Fig. 20) In this case the carbuncle was excised with a knife. Like the first it was of three weeks duration and was located in the mid capular region. Dakinization was begun on the second day and the progress of this patient has been very satisfactory. The wound has reached the stage where skin grafting could be practised with advantage and would hasten complete healing which occurs even in the ungrafted cases with surprising rapidity due to the contraction of the healing wound.



Fig. 20—Carbuncle of the neck. It is difficult to graft.

In none of the cases we have treated in this manner has glycosuria been present. In some the blood sugar percentage has been taken and the highest figure reached was 120 milligrams per 100 c.c. of blood. Gas and oxygen are used for a general anesthetic. One old gentleman on whom we operated by this technique for a large carbuncle of the neck was out of bed the same afternoon and contentedly enjoyed his pipe in the patient smoking room.

By this method the acute symptoms of obstruction were controlled although there was little drainage from the intestine for the first forty eight hours. At the end of that time the patient



Fig 21—The tumor of the transverse colon, showing the site of the tumor and the site of the colostomy.

was in good condition and was seen with us by Dr Charles Mixer of Boston who suggested washing out the distended and paralyzed cecum through the proximal opening which was accordingly done after removal of Paul's tube with marked and





diagnosis was a chronic obstruction from malignant growth in the colon

The abdomen was opened through the right rectus muscle. It contained a moderate amount of clear fluid. The cecum was greatly distended as was the ascending colon to a lesser degree. There was a narrow band like stenosing scarrous growth in the transverse colon about 2 inches beyond the hepatic flexure. No enlarged glands could be observed or palpated. The case was favorable for radical operation from the standpoint of malignancy and from the absence of metastasis. It was however complicated by an obstruction which was practically complete. The bowel proximal to the obstruction was loaded with a highly septic content. The surgical problem was first to relieve the obstruction and secondarily to eradicate the affected loop of gut and adjacent mesentery and to restore the continuity of the intestinal canal. The one stage operation is not applicable in this type of case. It is ideal in name only and not to be considered in cases of obstruction of the colon. It is in such a type of case that the Mikulicz two-stage or a in this case many stage operation is most striking in its applicability and results.

The first step consisted in the mobilization of the affected portion of the colon including the hepatic flexure and the proximal portion of the transverse colon. The mesocolon was divided near its origin the vessel were ligated and bled and the limbs of the mobilized loop were approximated by suture of the edges of the divided mesentery. This permitted the mobilized gut with the tumor in its center to be brought out through an oblique intramuscular incision near the anterior superior iliac spine. It was anchored to the peritoneum and muscular by two mattress sutures passing through these structure and the mesentery in opposite directions. The angles of the peritoneal incision were stitched to the side of the loop. Two Pauls tabs were then inserted into the protruding gut on each side of the tumor through small lateral incisions in the bowel and fixed by purse-string sutures. The peritoneal rectus incision had been closed in layers before opening the bowel and sealed with an

occult collision of in

350 m. 1942

patient's progress thereafter was very satisfactory. Irrigation of the cecum through the proximal opening was repeated on the following day. The protruding bowel showed no tendency to slough which sometimes occurs after wide mesenteric ligation.

The second stage operation was performed on December 15th, eight days after the first (Fig 21). The protruding loop of colon and mesentery including the growth was excised by the electrocautery close to the skin edge after preliminary irrigation of the gut (Fig 22). Several vessels required ligation. There was marked tendency of the distal end of the bowel to retract. The edges of both openings were sutured to the skin (Fig 23).

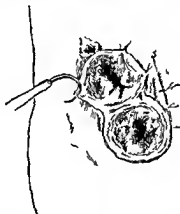


Fig 23—Fixation of bowel distally by suturing distal part of tract

The preliminary wound through the rectus muscle was clean and healed by primary union.

A third stage consisted in division of the spur separating the proximal and distal segments through the double barreled opening which now presented on the abdominal wall. Preliminary digital examination showed close approximation of the afferent and efferent limbs of the gut for several inches. On December 29th a Dupuytren's clamp was applied to this septum, the patient being given a little gas and oxygen for this procedure. The clamp was tightened on successive days, cut its way through, and was removed after five days.

immediate benefit. Dr. Mixter informs us that in some of these cases his father had been accustomed to perform a cecostomy in addition to the usual technic fastening his Mixter tube in the



Fig 2 —Ex f g t f l h h k by l e c n c a r y Above rela  
t f d f s e d l

cecum and bringing it out through a separate stab-wound. In this case the administration of eserin and trichnin at this time hastened the evacuation of the distended intestines. The pa

the large bowel is highly septic under any condition. This infective index is greatly increased in the presence of obstruction while the resistance of the patient is much decreased. The method practically insures against peritoneal contamination with its high percentage of mortality. Dowd has reported a series of 19 cases of partial colectomy with 1 death and quotes other authors in whose series the mortality ran from 12 to 17 per cent. These figures are much lower than the average mortality for resection of the colon where other methods are included. There is no reason why this procedure cannot be combined with the independent cecostomy to drain a distended and paralyzed cecum when the obstruction is located too far from the proximal colon to permit of spontaneous drainage through a colostomy opening. In desperate cases cecostomy alone may be practised as Erdman prefers and the Mikulicz procedure can then be carried out at a later date. If the tumor and the neighboring intestine along with the mobilized lymphatics and mesentery are cut away at the time of the first operation as is usually done both ends are ligated but the proximal end may be drained at once or opened after twenty four or forty eight hours. Where obstruction is present immediate drainage by a Paul tube is advisable. In our case we preferred to resect the colon as a second stage procedure at the end of eight days. In some cases the slight additional time and additional shock accompanying primary excision might be an unfortunate determining factor. It may be said that this operation aside from the advantages as regards insurance against peritoneal infection is strictly in accordance with the prime principle in operative surgery which limits each operative intervention so as to keep it within the range of the patient's resistance and in dangerous cases proceeds step by step to the goal.

On January 19 1923 the colostomy opening was closed. The bowel was mobilized by cutting away the sinile opening from the surrounding skin and by separation of the colon from the abdominal wall working mainly through an area of adhesions but thoroughly mobilizing it until it fell away from the abdominal wall. The intestinal opening was sutured transversely by chromic catgut and overlying linen stitches. The abdominal wound was sutured and drained at its lower angle by a cigarette drain. No leakage occurred. The wound in the abdominal wall healed quickly and without infection. The bowels moved after three days assisted by a small glycerin enema to the patient's delight. She was discharged from the hospital completely healed on February 4th eight and a half weeks after admission. Report of hospital pathologist Dr. Eiman is as follows:

Gross Specimen section of bowel 15 cm long very much thickened and indurated and the outer surface of which is yellowish green in color and covered by a necrotic appearing exudate. There is a hard constricting growth present in the center of the specimen which has a striated white appearance striation appearing to converge the concave surface of the bowel. On section this tissue is light gray in color surface presents smooth transparent appearance.

Micro Adenocarcinoma Excess of connective tissue

We have described this case in some detail because it exemplifies practically all of the advantages of the Mikulicz technique. The operation is an old one having been described by Mikulicz in 1907. Dr. Charles V. Dowd of New York has in recent years again emphasized the value of this method and points out the reduction in mortality in different series of cases operated upon by himself and others including Finkelstein Mayo and Tuttle. It is suitable to the resections of the colon from the hepatic flexure to the terminal sigmoid. Above the colon the fluid nature of the intestinal content and its moderate infective power render the one-stage operation generally appropriate except in cases of obstruction. The mortality of the Mikulicz operation is lower in colon resections whether done in the presence of obstruction or as an operation at time of election. The intestinal content of

COMPOUND FRACTURE OF TIBIA FRACTURE OF PATELLA  
AND CONDYLES OF FEMUR WITH SECONDARY SUP-  
PURATIVE ARTHRITIS AND DESTRUCTION OF KNEE  
JOINT AMPUTATION OF THIGH AND CLOSURE BY  
SECONDARY SUTURE

This case is included to illustrate the advantages of the secondary closure of amputation wounds through infected tissue. It demonstrates our ability to sterilize wounds which if closed by primary suture would result in long standing sup-  
puration and probably osteomyelitis and necrosis in the stump. This patient has been in the hospital for three months. His injury was sustained by having his right leg caught in the driving wheel of a locomotive while at his work as an oiler. When admitted he was suffering from shock and a hemorrhage too severe to permit of a primary amputation. In addition to the injuries of the bones there was a very extensive contusion of the soft parts and a hematoma of the thigh. The fractures became infected, the knee joint was disorganized and there was very extensive sloughing of the skin of the leg and the thigh. At this time he was under the care of my colleague Dr. Speese and refused amputation. After three months of suffering and prolonged suppuration he finally consented to an amputation. On December 12, 1922 we amputated through the middle third of the thigh using oblique flaps to avoid the inclusion of cicatricial tissue. It was observed that the subcutaneous tissue and the connective tissue generally were infiltrated and edematous. The muscles were also yellow and edematous. It seemed highly probable that the lymphatic tissues were infected at the site of formation of the flaps and that if the wound were closed suppuration could be expected. A delayed closure was therefore decided upon. This rendered the usual periosteal treatment of the bone unwise. It was accordingly sawed off flush with the point of division of the periosteum. The wound was packed with long strips of gauze saturated in Dakin's solution and



became and remained normal. Smears and cultures taken at frequent intervals after the beginning of the sterilization showed *Bacillus pyocyaneus* only on several occasions and at other times *Bacillus proteus*. There were 75 bacteria per field in the smears on December 18th, 1 in 5 fields on December 23d and none at all after this date. On December 29th seventeen days

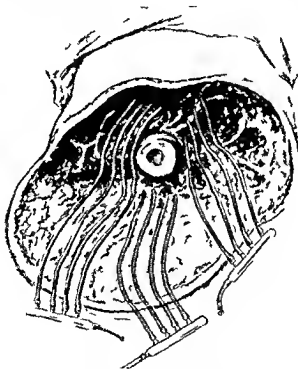


Fig 5—Ar g m t f tubes f t ruzat

after amputation had been practised the wound was closed by secondary suture the result of which was completely successful. Patient was out of bed ten days later and in fourteen days the wound was solidly healed (Fig 26)

It is our opinion that the delayed closure of potentially infected wounds admits of a wider range of application than is



provisional sutures of silkworm gut were used to secure them beneath the flaps. 2200 c.c. of salt solution were administered subpectorally by infusion during the operation which was not attended by shock. Three days later the patient was given nitrous oxide gas and oxygen. The sutures were removed and the packing was taken out. It was very foul and saturated

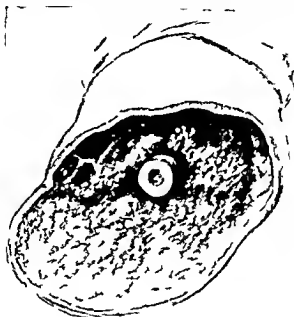


Fig. 24—Appearance of stump after removal of packing.

with pus (Fig. 24). Smears and cultures were made from this and 12 Dakin tubes were applied to the face of the stump and instructions given 50 c.c. of Dakin solution were to be injected at each irrigation thereafter (Fig. 25). Cultures showed *Bacillus pyocyaneus* and a few streptococci. Under Carrel's the wound cleaned rapidly. The temperature only reached 100° F. one day after the amputation and shortly thereafter

## TUMOR OF NECK CARCINOMA PRIMARY OR SECONDARY(?) REMOVAL OF TUMOR WITH RESECTION OF THE THREE CAROTIDS AND THE INTERNAL JUGULAR VEIN

THE accompanying illustration was made from a specimen of tumor of the neck removed by us two years ago and which we show in order to place on record a case which presented some unusual points of interest both from a diagnostic and operative standpoint. The patient was an old man seventy three years of age who presented himself with a tumor of the left side of the neck. It was of three or four months duration. It was approximately 3 inches in diameter hard insensitive slightly movable and apparently more or less intimately attached to the great vessels. A careful examination of the patient included a laryngologic examination by Dr A H Cleveland and failed to show any primary malignant focus. A diagnosis of lympho sarcoma seemed most probable although carotid tumor was also considered as a possible explanation. It was decided to attempt its removal. The operation was a difficult one and we were forcibly reminded during its performance of some succinct remarks by Dr J Chalmers DaCosta when detailing his own experience with a case of carotid tumor. The technical problems were identical. Not only was the growth so firmly adherent to and fused with the carotids as to render its separation impossible but to make matters worse the internal jugular vein ran through the growth and was infiltrated by it. A resection of the common internal and external carotid arteries was necessary along with the internal jugular vein. The former structures are shown in the illustration lying on the posterior surface of the tumor while the vein runs through it (Fig 27). The common carotid was ligated first and cut across below the tumor and the latter with the vessels separated from the underlying pneumogastric nerve from below upward. The portion of the sternocleidomastoid muscle overlying the growth was removed with it.

generally understood. In acute traumatic surgery and especially in the treatment of compound fractures of the large bones it is certainly indicated in many cases. We are not in sympathy with those methods of treatment which yield brilliant



Fig. 26—Appearance of the wound after the dressing is removed before discharge from the hospital.

results in some cases but are accompanied by a calculable percentage of lamentable results. The same principles of delayed closure are equally appropriate in chronic cases where infection is to be anticipated.

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The vessels were then ligated above the tumor and divided. The submaxillary salivary gland was also removed through the same angular incision although apparently not involved. The patient recovered from this operation without showing signs of acute cerebral softening. Some two months later I examined him and he complained of some shooting pains in the left side of his head and insomnia. He had had a tonsillar or peritonsillar infection and his physician said a slough of the tonsil for



Fig. 27.—The posterior face of the tumor with the sectioned carotid vessels attached. The internal jugular vein runs through the growth.

which the diminished blood supply might partly account. He had an obstinate bronchial cough also complained of double vision. Eye examination by Dr. Deschler. Uveitis with atrophy of choroid and pigment deposits and exudate into vitreous. There was at this time a suppurative induration the size of a grape appearing at the upper angle of the wound. He was given the benefit of adriatic radium being used externally and by needling. Despite this treatment recurrent malignant infiltration of the upper carotid triangle was quite extensive when

last seen five months after operation. We learned that he died some months after this examination but the exact date was not ascertained.

The pathologic report by Dr Eiman is as follows. Specimen consists of an irregular lobulated tumor mass to which is attached a piece of voluntary muscle, a piece of common carotid artery and pieces of internal and external carotids. Internal and external carotids measure respectively 1 and 1.5 cm. Common carotid measures 2.3 cm. The tumor mass measures 5.5 x 4.7 x 3 cm. It shows no definite capsule but is fairly sharply circumscribed. The tumor infiltrates into the adhering muscle. It cuts with increased gritty resistance, section surface slightly granular and mottled in appearance from yellowish gray to yellow. The grayish areas are fleshy in consistence. The yellowish areas are more firm and somewhat gritty. The cut surface is not unlike the scirrhous cancers of the breast.

Gland 5 x 2.3 x 2 cm (submaxillary salivary gland). Capsule definite, cuts without increased resistance, cut surfaces lobulated, grayish yellow in color, consistence firm. No evidence of neoplastic growth.

Micro. Squamous cell carcinoma.

The framework is composed of fairly dense connective tissue which shows moderate infiltration of small round cells and plasma. There is nothing to show that this is metastatic carcinoma in the lymph node. If primary growth of squamous cell carcinoma anywhere in the buccal, pharyngeal or laryngeal mucous membranes can be eliminated, this tumor may be an enclavoma springing from the rest of epithelial cells lining the branchial clefts.

The epithelial cells occur in irregular nests and show many pearly bodies and occasionally a karyokinetic figure. No chromophil granules seen. There is no capsule. The epithelial cells infiltrate into adjacent muscle. Salivary gland shows no noteworthy lesions. The cells of some acini show some mucoid degeneration.

The growth is either a primary carcinoma of branchio-genetic origin or a metastatic growth, the primary focus not being dis-

covered after repeated examinations. There are certain cases of metastatic carcinoma of the neck in which the primary cancer of the upper air passages escape detection. This was emphasized in a discussion at a recent meeting of the American Surgical Association. Unfortunately no autopsy was obtained in this case. In view of the failure to detect a primary cancer elsewhere and the well limited character of the growth we were led to attempt its removal. Had it proved to be a carotid tumor the chances of greater prolongation of life than was obtained in this case would have been good.

## CLINIC OF DR GEORGE P MULLER

### UNIVERSITY HOSPITAL

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## OLD DISLOCATION OF THE HIP TREATED BY OPEN INCISION

THE first patient to be shown you represents a rather rare condition extremely difficult to treat. The history is as follows.

J M aged thirty five. On June 5 1922 was injured by having a log roll over the thigh and side. Dislocation of the hip diagnosed and reduction effected under ether anesthesia. Remained in the hospital nineteen days and then left at his own request. Remained in bed for one month went back to the hospital and further attempt was made to reduce the dislocation. No improvement. Came under our observation December 12 1922 six months after the injury. Examination reveals usual deformity over a posterior dislocation of the head of the left femur and this is confirmed by the x ray (Fig 28) which also shows a fracture of the lip of the acetabulum.

Just when an unreduced luxation of the hip may be classified as old is a mooted question. Some authors classify the lesion as old when closed reduction is no longer possible but this classification is open to discussion since some surgeons among them Schoemaker of The Hague have reported successful reductions many years after inception of the injury although Sir Astley Cooper considered that after eight weeks no attempt should be made to reduce a hip dislocation.

The difficulties which must be surmounted by either open or closed reduction are (1) The shortening of the soft parts (muscles ligaments nerves and vessels) (2) the narrowing of the capsule and (3) the filling of the acetabulum with shreds of the torn capsule and with newly formed connective tissue (4) the fixation of the head in its false position.



Payr, Dollinger and Buchanan are advocates of open reduction. They think that closed reduction is potentially more dangerous because the femur may be fractured, muscles, tendons or vessels may be ruptured with resulting hemorrhage and because the attending shock is more severe following the rough handling which must be resorted to in the posterior method.

Open reduction is extremely difficult and is not entirely devoid of danger. In fact anyone who thinks it is simple should



Fig. 28.—Posterior method of the femur.

pause before undertaking the procedure. At times it is impossible to reduce the luxation even after incision and resection of the head must be done in an attempt to improve function.

My experience is limited to 2 cases. The operation in the first case performed last year consumed four hours and the trauma inflicted was so great that the patient died from shock. It was a very interesting case, the patient being admitted after an automobile accident in very serious condition. He had a fracture of the skull, the malar bone and the right femur. The

x rays always made to determine the condition of the fractured femur never showed the dislocation and there were no clinical symptoms of it. In January 1922 I plated the femur and it was not until we got him out of bed many weeks later that the extreme shortening was detected and the true condition diagnosed. Twenty weeks from the time of injury elapsed before the

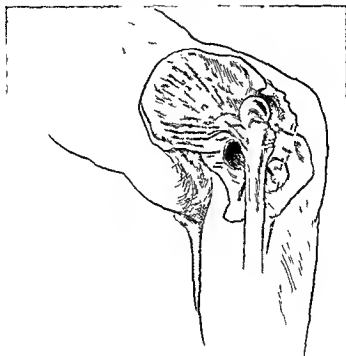


Fig. 29.—Diagram illustrating the path through which the head must pass before dislocation can be accomplished.

operation for the reduction of the dislocation was done. I approached the joint through a Kocher incision and naturally we were much impeded in our leverage manipulations and extension by the recent plated fracture. The acetabulum was filled flush with exudate and the attempt to skid the head of the bone into it after it was cleared consumed the time.

In the ordinary case preliminary extension is of use in drawing the head of the femur down to the level of the acetabulum and in stretching ligamentous and muscular tissues. Much discussion has taken place as to the method of approach and usually the Kocher incision has been employed but in this patient shown to you today you will note that the incision was an oblique one beginning above the trochanter and extending



Fig. 30—Complete distal — ray t h l t before discharge

backward and upward. I simply sliced across the gluteal muscles and caught my vessel as they were cut. The exposure was ideal. The acetabulum was filled up but was easily scooped out although I noticed that the piece of the rim of the acetabulum was not removed. In this patient I was a few seconds because of the absence of fracture and we were able with but little difficulty to throw the head of the bone into the cavity after the latter

had been prepared. The result is eminently successful as you will see from the  $x$  ray (Fig. 30). During the operation I was so unfortunate as to break one of my knives and to be unable to find the blade after a brief search. You will notice that this appears in the picture. The wound healed by first intention and the man is now walking around eight weeks afterward. We simply placed him in a plaster cast after the open reduction.



## TUBERCULOSIS OF THE HIP JOINT

THE next case presents a number of points of practical interest. He was first treated by a well known and first class orthopedist but for various reasons did not do well. I was obliged to take him on my service because of the desire to favor the doctor who referred him. The preliminary history of the patient is as follows:

B. S. aged seven. Three years previously he developed the classical symptoms of tuberculous coxitis and remained more or less untreated for a period of six months at which time he was operated on for abscess. A year later a second operation was necessary. Since this time there has remained a sinus on the outer surface of the right thigh and about 2 inches below the joint. The child was sent to a seashore house at Atlantic City but was not improved on the contrary he was made worse. He was admitted to my service in the Medico-Chirurgical Hospital on July 20, 1921 anemic, toxic and evidently suffering from a severe mixed infection with acute exacerbation in the hip joint. Yellow pus was discharging from the sinus and there was fever of 103 F. Muscular rigidity was pronounced.

The child was placed on a Bradford frame and Buck's extension applied. To my surprise only the *Staphylococcus albus* was found in the pus. The x-ray revealed considerable destruction of the head and neck of the femur of a tuberculous character (Fig. 31). For a time we gave the child an autogenous vaccine together with old tuberculin irrigating the sinus daily with a 1 per cent solution of mercurochrome. On August 30th through an anterior incision I opened the hip joint and very gently curetted the remains of the head and neck of the femur. The disease had extended to the acetabulum. I debrided the sinus and inserted four Dakin tubes through the anterior and lateral openings. The child did well. An x-ray report one month later reads as follows: "The broken up and irregular moth eaten appearance of the bone in the region of the neck and tuberosity of

the right femur has practically disappeared. There now remains only a shell of bone conforming to the outline of the interior surface of the neck of the femur. The general appearance suggests a healthy reparative process. The surrounding bone is assuming a more healthful and normal density (Fig. 32). In November although the child made very good progress we decided to transfuse him and he was given 300 c.c. of citrated



Fig. 31—First x-ray of the early infant boy described.

blood repeated two weeks later. The result was exceedingly satisfactory in that the red cell increased from 3,000,000 to 5,050,000 and the discharge from the hip became very much less. I had an x-ray taken of him just before he left the hospital in the latter part of December. It showed that the right hip-joint in comparison with a previous examination made several months ago reveals most marked and definite evidence of abun-

dant bone repair The neck of the femur shows a dense sclerosis smooth in outline and normal in contour The head of the femur is beginning to take on a normal aspect as to form and relation It is quite clearly discernible The structures about the acetabular cavity are all regenerating (Fig 33)

You will notice that he is able to get around quite well with a brace a high shoe and crutches He has 3 inches of shortening He attends school (January 15 1923)



Fig 32—C d t m th l t

Transfusion was resorted to in an endeavor to increase the bactericidal and antitoxic properties of the blood I feel that there is a large group of cases suffering from chronic and subacute infections which are materially benefited by transfusion Whether or not the blood introduced stimulates the hematopoietic structures or merely throws into the circulation functioning



corpuscles is not definitely understood. The blood however probably contains antibodies which affect the life of the organisms causing the infection or it may so stimulate the patients as to help them develop an active immunity. There is no doubt in my mind that transfusion has been a supporting factor in cases of this type. I do not transfuse during the stage of acute infection.



Fig. 33.—Regeneration of the femur after amputation.

The regeneration in this case probably occurred in part from the periosteum. It may be as Haas has shown that the blood clot left behind after the curettage stimulated bone regeneration. Shede and Bier have also recognized the value of blood clot in osseous regeneration. Since the first X-ray shows very little of the neck of the femur remaining, it is unlikely that the regeneration of bone is entirely dependent upon the presence of pre-existing bone.

It is very necessary in cases of this character to remove the necrotic material but the curettement should be very conservatively done since Todd has found the cancellous tissue one of the important factors in bone regeneration therefore any healthy cancellous bone should be retained

Suppuration must be controlled as early as possible The vaccine we used as well as the tuberculin seemed to help somewhat but free exit of pus from the suppurating area incising for drainage wherever and whenever necessary undoubtedly did the most in obtaining the successful result in this case Most experimenters are in accord that regenerating bone is very sensitive to inefficient drainage It should be remembered that in case of tuberculosis of the bone there is no new bone or sclerosis process thrown out around the infection but that here we have a purely destructive osteodepressant process

corpuscles is not definite  
probably contains antitoxin  
causing the infection  
help them develop in  
in my mind that in  
cases of this type of  
infection



F 1

The re-  
the perit-  
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tion. She  
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## ARSPHENAMIN JAUNDICE SIMULATING BILIARY DUCT OBSTRUCTION

JAUNDICE as the surgeon sees it is almost always due to obstruction of the common duct by stone or swelling of the pancreas. Sometimes we encounter catarrhal jaundice so called and sometimes we see jaundice associated with splenomegaly and with hepatic cirrhosis etc. To these must be added arphenamin jaundice and it is only within the last few years that we have become familiar with this complication of the treatment of syphilis. The patient I am about to show you was seen in consultation with Dr Rovno and I must admit that I was suspicious of a surgical obstruction of his duct. The history is as follows:

A W. aged forty one. For several years has had neuritis in the left shoulder for which he underwent all kinds of treatment at hospital and from private physicians. Eight months ago and apparently without a positive Wassermann reaction he was given twelve intravenous injections of salvarsan but without relief of his neuritis. Later he went to a private physician who continued this treatment and gave him some intramuscular injections the nature of which was unknown. The neuritis was cured. He then noted jaundice was appearing the skin and eye turning yellow and at the same time experienced nausea a sense of fullness in the upper abdomen and heartburn relieved by the taking of soda. The urine has been dark and the stools of a clay color. He had no itching of his skin. Physical examination on admission revealed nothing except an enlargement of the liver extending 1 inch below the costal margin and the generalized icterus. He also had protruding hemorrhoids. A few days ago I removed these in the usual way under gas anesthesia.

There is nothing else to remark about this patient except that we found a positive Wassermann reaction. There



are usually light green in color may be actually clay colored. The latter is more apt to occur in the severe or fatal cases which simulate acute yellow atrophy.

The average duration of the jaundice is about four weeks but it may persist for several months. The consensus of opinion of the more recent writers is that the pathology is probably that of a diffuse interlobular hepatitis. The persistent presence of bile in the feces except in the fatal cases simulating acute yellow atrophy, the dissociation of the biliary substances as excreted in the bile, and the slow disappearance of the jaundice are against obstruction as a cause of the icterus. Van der Burgh has been able to differentiate between jaundice from liver damage from that due to stasis, and this test will certainly assist in cases in the future where the differential diagnosis may appear difficult.

Note—Four months after discharge from the hospital the jaundice had disappeared and the patient was entirely well. His physician has been giving him the old mixed treatment.

seems to be no suggestion in his previous history as to how and why he should be icteric. He has 6 children living and well and his mother and father attained an extreme age the latter dying at the age of eighty two. Three brothers and 3 sisters are living and well. The important point in this case is simply the addition of another cause for jaundice and the necessity for care in not mistaking it for a surgical lesion. The increasing use of salvarsan by the general practitioner justifies the following remarks:

Jaundice of icteric origin may occur (1) During the florid stage of the disease (syphilitic hepatitis) (2) From acute necrotic hepatitis (3) In association with hepatic gumma or cirrhosis (4) After arsphenamin therapy. Jaundice associated with arsphenamin treatment may be due to (1) The action of arsphenamin upon the spirochetes infecting the liver or (2) it may be entirely due to arsenical poisoning of the hepatic parenchyma with a resulting fatty degeneration.

The jaundice may occur during or as late as ten or twelve weeks following treatment. Late jaundice is not infrequent and a history of previous arsphenamin treatment in jaundiced patients is extremely important. Harrison states that jaundice occurs in 0.6 per cent of the cases of syphilis during or subsequent to treatment with arsenical preparation. Todd has observed that the jaundice occurs more frequently in the winter when the diet is high in fat and proteins. Physical examination shows hepatic enlargement in from 40 to 50 per cent of the cases but this tends to decrease later in the disease. Decrease in the size of the liver during the jaundice is a distinct common duct obstruction from stone.

The disease is usually afebrile but prodromal symptoms and a marked febrile reaction may be present. Occasionally as in this patient the temperature may rise to 103° or 104° F. and chills, nausea and vomiting and epigastric pain may complicate the picture. Pruritus may be distressing. Abdominal tenderness is located in the epigastrium or over the enlarged liver is usually demonstrable. Bile pigments in the feces may be diminished but this is not the rule although occasionally the stools which

## ABNORMALITY OF KIDNEY PELVIS WITH PYONEPHROSIS

THE diagnosis and treatment of hydronephrosis and pyonephrosis is sometimes complicated by the presence of anomalies of the kidney formation. Mostly these are in the form of the horse shoe kidney or double ureters. An extremely interesting and curious example is seen in the following case and one which we believe is unique or nearly so in the literature of the subject.

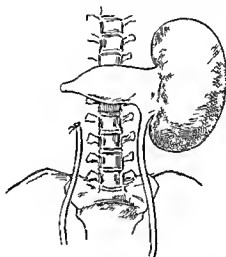


Fig 34—C d t f d t t p y

The patient died recently and this is the specimen (Fig 34). The case history is as follows:

J. K., aged twenty, was admitted to the Medico-Chirurgical Hospital August 21, 1921, with a chief complaint of pain in the right lumbar region and hematuria. Four years ago he began to have attacks of dull pain in lumbar region which radiated around the crest of the ilium over to the right iliac fossa. These attacks were always relieved by magnesium citrate and recurred





it was not connected with the other side. Two days after operation following a temporary anuria the patient commenced to pass large quantities of urinous fluid from the wound and for a period of seven days all of the urine was apparently voided through the right wound. We were completely mystified hardly believing that it was possible that an anomalous condition of the ureters was side tracking the urine. At the end of this week he commenced to void and five days later the fistulous tract was completely closed.

This state of affairs recurred again and again the patient

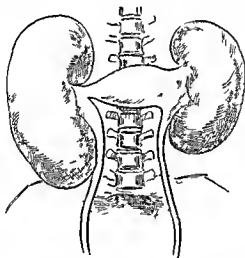


Fig 35—Re-tract d p c t f d t p e s e t t f i r s t p e r a t

having a period of apparent normality only to be followed by suppression and fistulous discharge from the side. During an entire year he remained in practically the same condition but at the end of that time became uremic and was admitted to the University Hospital on January 4 1923 and died the same day. At autopsy the left kidney was found to be about four times the normal size. A large cystic mass between the kidney and the vertebral column proved to be the left pelvis which was full of pussy urine. Dissection showed that this pelvis extended posterior to the aorta and the vena cava to the right side where a fis-

only when patient was constipated. Last attack was five days before admission when he had had no bowel movement for forty eight hours. The purgative gave the usual relief pain ceasing upon his emptying his bowels. Two days later patient was suffering no pain but noticed large amounts of blood in his urine. He had no polyuria and no constitutional symptoms of any sort. Patient gave no history of having undergone any sort of strain or traumatism prior to onset of hematuria. He stated that he had had during the recurrent attacks of lumbar pain no general abdominal tenderness or pain and never vomited except once and this was caused by some medicine he had taken. Never noticed blood in stools.

Physical examination revealed nothing abnormal no enlargement being felt over either kidney. Cystoscopic examination showed blood spurting from the right ureter left ureter negative. No indocarmine elimination from either kidney at seventeen minutes. A diagnosis of essential hematuria was made and the patient discharged but he later returned with an exacerbation of the pain. On August 15 1921 Dr. Raydin performed a nephrostomy on the right kidney. The operation was rapidly done under gas anesthesia and but few observations were made. The drain was inserted directly through the kidney into the pelvis. For a while he did well and it is interesting to record that on September 23 1921 Dr. Mackinney found a normal flow of indocarmine from the left ureter but was unable to pass a catheter up the right side. I have said that he did well but it was noted that there was still some febrile reaction. After a few weeks it was decided that he was absorbing from his right kidney and accordingly on October 29 1921 I performed nephrectomy. The notes of the operation are as follows. The old scar was excised and the kidney exposed and found to be fairly adherent. The lower pole of the kidney was hooked like a tongue resembling very closely at first a horse shoe kidney. The kidney freed the pedicle ligated and the kidney removed. The renal pouch was drained with latex rubber tube. Wound closed in the usual manner.

Although the lower end of the kidney was sickle shaped yet

## SECONDARY SUTURE IN THE TREATMENT OF INFECTIONS OF THE NECK

FREQUENTLY we encounter tuberculous cervical adenitis which has broken down and become involved by mixed infection. If one dissects out the tuberculous mass and closes the wound with simple drainage we frequently have a nasty infection developed which ruins the scar and causes prolonged convalescence. In other cases there may be a simple suppurative adenitis and here again we would like to obtain better cosmetic appearances than is usual. For this reason I have deliberately planned a wide primary excision of infected glands either suppurative or tuberculous followed at a later time by complete suture of the wound. In all we have had over 20 cases but this patient will serve as an example.

A B aged nine. The child has had swollen glands of the neck for many months. Recently they have increased in size become fused and probably infected because you notice a red bulging mass and we have the further evidence of fever. Under ether anesthesia I made a 3 inch incision and carefully dissected a mass of infected glands from the submaxillary region extending downward and outward under the sternomastoid muscle. Some of the glands had broken down so that at times there was free pus in the wound. Wound was swabbed clean the edges lifted and it was carefully packed with iodoform gauze. One week later after treatment in a way to be described the edges of the wound were freshened and sutured together. This sutured wound healed perfectly and you will notice that the scar is small narrow and soft and the parent of the child is well satisfied with the result.

In these cases we have been so bothered by secondary infection unsightly scars and recurrence by reason of inadequate operation that it seemed worthwhile to change the plan. Furthermore even in some of the clean cases it has been necessary

tulous opening, communicated with the incision in the right loin. The right ureter was found and its upper end was tightly closed. The left ureter was patulous (Fig. 35).

Diagnosis — Left sided pyonephrosis with communicating pelvis.

It is hard to explain this case and as I have said we have been unable to find a similar case in the literature. Embryologically the kidney pelvis is the upper dilated portion of an outgrowth from the mesonephric (Wolffian) duct. As a result of embryologic discrepancies many renal or ureteral abnormalities may occur. In the horseshoe kidney two renal pelvises and ureters are usually present. In 100 cases of duplication of the renal pelvis and ureter collected by Mertz 21 per cent were bilateral. At times the fusion may be so extensive that a single renal pelvis may occur. In the cases of double ureters and pelvis it seems most likely that the anlagen of the kidneys have fused secondarily after the tubular outgrowth from the mesonephric duct has taken place. This later forms the ureter and pelvis.

In this case it seems that a communication between the upper dilated portions of the primitive renal pelvises must have taken place when they were extending toward the ventral side of the vertebral column.

At autopsy the left kidney showed no evidence of having the slightest connection with the right one. Many abnormalities of the ureters have been described among them double or triple ureters or pelvises from a fused kidney or from a single kidney. The renal pelvis may be subdivided into a number of tubular calyces or it may be cleaved into two separate compartments either alone or together with a doubling of the ureter. The ureter may occasionally be absent and it may at times empty into the seminal vesicle into the ejaculatory ducts or prostatic urethra.

There can be no doubt but that renal abnormalities predispose to disease. In this case infection of the one side surely led to infection of the other. It is to be regretted that although cystoscopy and ureteral catheterization as practised no pyelograms were made. The condition was not diagnosed ante mortem because the patient refused further cystoscopic study.

Carrel method until a negative culture is obtained. The presence of staphylococci is no contraindication to closure by this method nor is a microbic count as suggested by Carrel essential.

Usually in from five to seven days we are ready for the secondary operation.

The technic of the secondary closure is as follows. The area surrounding the wound is cleansed with ether and then painted with picric acid (5 per cent in 95 per cent alcohol). A cataract knife is used to pare the skin edges. This is especially necessary if more than six or eight days have elapsed following the primary operation and the skin edges have become thin and bluish. The superficial succulent granulation tissue is then removed by dissection or curettement. It is preferable to dissect off the granulation tissue for in curettement there is too great a danger of feeding the cocci which may be present in the superficial layers into the deeper freshly exposed surfaces of the wound.

It is of importance to be sure that the deep as well as the superficial surfaces are closely coapted. Dead spaces will fill with blood oozing from the freshly denuded surfaces and infection of the clot will probably lead to failure of the closure. I do not believe in the use of deep buried sutures of catgut to obtain subcutaneous coaptation. I feel that it invites infection and have routinely used when necessary deep tension sutures of silkworm gut which are inserted as vertical mattress sutures and passed through rubber tubing. The intervening skin edges are then brought together by Michel clips. No drainage is practised. Rubber dam and tubing acting as foreign bodies seem to invite infection and sepsis is apt to appear along the line of the drainage tract even though it may be removed at an early date (Fig. 36).

If the wound appears to be red and somewhat swollen at any subsequent dressing I make it a practice to avoid probing. It is my routine to apply in these cases a warm wet compress of boric acid and glycerin. The infection if present can usually be taken care of in this way and the suture line will not be demonstrably affected. It is a mistake to probe or open the wound for a mere elevation of the temperature especially when the smear

to tap the wound several times during the healing, in order to evacuate serum collections. While as yet we have not attempted the two-stage operation in such cases I feel inclined to do so. The procedure is as follows:

At the primary operation after the incision has been made and the dissection done the skin edges around the sinus should be carefully trimmed in order to remove all devitalized skin because this only harbors skin cocci which may spread into the deeper tissues and it is of no use at the secondary operation where the coaptation of healthy lined edges is essential for a good cosmetic result. As mentioned in the description of the case the wound is packed with iodoform gauze plain or soaked with liquid petrolatum. Sometimes when there is much ooze we have used packing soaked with Whithead's varnish. Each day the packing is removed, the wound cleansed with hydrogen peroxid, dried and repacked except in those wounds which are slowing to a considerable degree in which case a Carrel tube is packed in and Dakin's solution instilled. At each packing care should be taken to continue the elevation of the skin flaps and packing under them in order to prevent their adhesions to the deeper tissues with resulting inversion reaction and fixation of the edges of the wound. Sometimes toward the end we have used a solution of gentian violet. In other cases we have used acetic acid and alcohol. As a result of the treatment there develops a layer of loose and extremely vascular granulation tissue. Surrounding this there is a stratum of connective tissue and an area infiltrated with round cells and leukocytes. The field is therefore prepared not only by new tissue formation but also because of the added local resistance from the leukocytes and a certain amount of general immunity which develops against the usual skin cocci.

After the wound is apparently clean it is cultured to determine the presence or absence of streptococci. If this is not done routinely certain of the wounds after the secondary operation will become red and swollen, there will be a marked elevation of the temperature and the wound will break down. When the streptococcus is present in the wound Dakin's solution is used by the

for streptococci was negative for this does not indicate suppuration. In 2 cases which did necessitate drainage after the secondary suture I removed one or two sutures and inserted a small rubber tube surrounding the part with wet dressings.

In the normal case all sutures and clips are removed on the fifth day. This insures a wound free from the usual suture markings which characterize cervical wounds with late removal of the sutures. Tension strips of adhesive plaster may be used to reinforce the wound edges if this is desired.



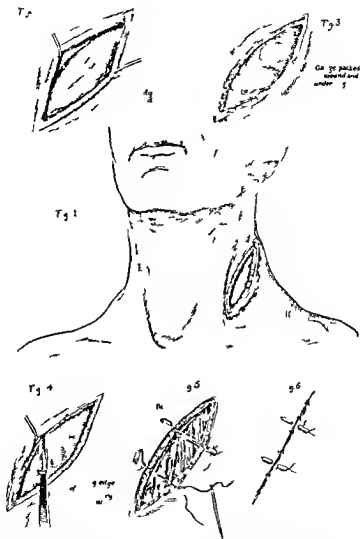


Fig 36—The steps of the operation of Wundt dissection. 2. 3. dge 1 vat d and pa k g m place 4 p parat f dge f seco dary tur 5 sert f vert cal matt sa t 6 d closed

# CLINIC OF DR. E. L. ELIASON

## UNIVERSITY HOSPITAL

### RUPTURED LIVER (AUTOTRANSFUSION)

THIS case was admitted to our Emergency Service as an acute abdomen. The patient is a boy of thirteen years in severe shock. His mother states that an automobile struck him knocking him down. She does not know whether the car ran over his body or merely knocked him aside.

**Condition on Admission**—Patient is in extreme shock. Temperature 96 pulse 144 respirations 28 pale restless and semiconscious. Blood pressure is 80 systolic and no registry for diastolic. Skin is dry and cool and mucous membranes are not markedly pallid. He is very restless and constantly asks for water. The abdomen is flat and there is a long contusion and abrasion across the left lower quadrant just above the iliac crest. There is dulness to percussion over the left lower abdomen and in the left flank. Palpation demonstrates a fine crepitant sensation. Auscultation finds that peristalsis is decreased in frequency but increased in magnitude. There is generalized tenderness over the entire abdomen. Blood examination. Red blood cells 3 100 000 white blood cells 12 000 hemoglobin 67 per cent. Urinalysis shows no blood.

**Tentative Diagnosis**—Internal hemorrhage from ruptured viscus. Operation was decided upon and a donor was sought for transfusion.

1 h t d th ga 4 th se f bd m l h m hag It  
rem d f th b ly pe pt bl p tat bt d bc t  
eo l tt d h mat ma ft xam nat h v b k p th  
l t I have ve be bl t bt t t th sam pl t  
m t wh h m y be tt h t d t th d t t f th ly l t  
bet ee t t l col



white blood cells 18 000 Hb 62 per cent the third day and red blood cells 3 610 000 white blood cells 9000 Hb 56 per cent the fifth day red blood cells 4 090 000 white blood cells 14 600 Hb 62 per cent on the eighth day

On the tenth day after operation the final packing was removed and on the thirteenth day all hile drainage had ceased. On the fifteenth day the patient began having severe pain in abdomen and became distended. In a short time there was a profuse discharge from the wound of a clear limpid fluid and the abdominal pain ceased. This clear fluid drainage continued for one week. Examination showed no organisms and no digestive ferments in the drainage. Three weeks after operation the wound had closed and the patient was discharged to report at follow up date.

**Result**—Patient was readmitted two weeks later for pain in right iliac fossa. This however cleared up after a few hours and the patient is now well.

In the title of this report the term autotransfusion is used. The question arises as to whether we should not use reinfusion or retransfusion. It is however of little moment except for the establishment of unity in the literature.

Grant reported a case of autotransfusion where the patient a very plethoric individual was bled and thus citrated blood used twenty four hours later following an operation that caused great loss of blood.

Lee reports a few cases of his own and of other surgeons of intra abdominal hemorrhage in which retransfusion was used.

Schweister reports 21 cases of ectopic pregnancy with hemorrhage in which reinfusion was performed.

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- 3 Re f t Sch t M d h m d W h M h 1922

Operation—With the patient growing rapidly worse gas anesthesia was given and simultaneously with the abdominal incision a vein in his arm was opened ready for the blood from the donor who has not yet appeared. The abdomen was opened through a left rectus incision as it was here that evidence of trauma existed. The peritoneum which appeared blue was opened by puncture and the blood that virtually squirted out was collected in a flask with sodium citrate. Thus citrated blood 300 c.c. was replaced in the patient's vein and as it was being given the pulse which had become imperceptible at the wrist slowly returned and could be counted at 144. A donor was finally obtained and 200 c.c. of his blood was also given after the operation was completed.

The abdominal wound was enlarged and the clotted blood remaining was mopped out. Examination of the spleen and the upper surface of the liver found no rupture. The under surface of the liver showed a laceration 1 inch deep and about 3 inches long just to the left of the spigelian lobe which was bleeding profusely. Gauze packing was tamped into the laceration the part coming out through the abdomen being surrounded by rubber-dam. The patient left the table in good condition and with a pulse of 120. The retransfusion and transfusion caused no untoward reaction.

The wound drained bile freely with but little or no fresh blood. On the third day the patient became very restless vomited persistently and the pulse mounted to 168. Urinalysis showed acetone and diacetic acid. Intravenous injection of 400 c.c. of 2½ per cent soda bicarbonate and 5 per cent lactate was given. The vomiting stopped immediately the restlessness ceased and the pulse began to drop. For the first few days the patient was very lethargic drowsy and showed very little interest in anything. His bowel movements were few somewhat reduced in color but had bile-pigment in them. At no time was there any bilirubin or urobilin present in the urine.

Blood examinations for the week following were as follows:  
 Red blood cells 3,810,000 white blood cells 20,000 Hb 65 per cent the day following operation red blood cells 4,100,000

white blood cells 18 000 Hb 62 per cent the third day and red blood cells 3 610 000 white blood cells 9000 Hb 56 per cent the fifth day red blood cells 4 090 000 white blood cells 14 600 Hb 62 per cent on the eighth day

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## DOUBLE KIDNEY WITH SUSPECTED CALCULI IN BOTH Pelves

THE patient we are to operate upon this morning came to us four weeks ago with the diagnosis of chronic appendicitis. The findings that were made during our routine examination of so-called chronic appendicitis cases are of sufficient interest and importance to report in some detail.

Case No 527 N S S B aged thirty eight years C C Pain in the right lower abdomen. He gives the history that for the past twelve years he has had recurrent attacks of severe pain in the right side of the abdomen starting as a generalized ache and later localizing low down in the right lower abdomen. He has had six to eight attacks in all. The attacks usually last from three to four days and often require morphin. The pain does not radiate and is not associated with fever nausea or vomiting. In at least two attacks the pain has been so severe that it caused him to writhe and break into a profuse cold sweat. There never has been any associated urinary symptoms or any digestive disturbances.

Physical examination shows nothing bearing upon his condition until we reach the right lower quadrant of his abdomen. Here directly over McBurney's point definite and decided tenderness is found on deep palpation.

Urinalysis—Amber 1025 and faint trace of albumin no sugar no casts no erythrocytes an occasional leukocyte and a few crystals.

The blood showed 7400 white blood cells. Blood pressure is 130/80.

Tentative Diagnosis—Interval appendicitis (chronic)

Further examination by the x ray shows three suspicious shadows in the region of the right renal pelvis and another low down near the lower end of the ureter (Fig. 37).

Cystoscopic examination showed two ureteral orifices on the





Fig. 37—(Case 527 N S) Shadow of suspected nary cal in the  
pelvis of kidney and bilateral ureteral orifice

right, both functioning. Catheters were passed up both these  
ureters and clear urine was withdrawn

As the patient had had all the exposure to the ray that was

deemed advisable he was allowed to go home to return after three weeks

On readmission a pyelogram (Fig 38) was done and it



Fig 38—(Ca 527 N S) Pyelogram with p q cath t sert d t  
both pel f d bl k d y

was found that the upper three shadows were obliterated by the sodium bromid injected into the two pelvis through the double ureters. The lower shadow was found to be situated at a dis-

tance from both ureteral lines. The roentgenologist was not satisfied that the shadows were in the pelves of the kidney and asked to take another view without the injection. This was done and the original three shadows were present. This seemed sufficient evidence that the shadows were very probably to quote the roentgenologist cast by renal calculi although as he stated he could not definitely place the upper shadow within the kidney shadow.

Anticipating the possibility of being compelled to remove the kidney in question the renal function was next taken with intramuscular injection of phenolsulphonephthalein. The left kidney secretion appeared in four minutes with a total of 25 per cent in half an hour and the right kidney showed 23 per cent total in half an hour further evidence that the kidneys were functioning equally well.

**Preoperative Diagnosis**—(1) Calculi in a double nephritic kidney. (2) Possible chronic appendicitis.

With these findings we think we are justified in exploring the right kidney.

The patient is placed in the left lateral position with a sand bag beneath the left loin. He does not take the gas-oxygen anesthesia well in fact the anesthetist cannot get him sufficiently anesthetized. We therefore change to ether. As I have told you before we frequently have this trouble with these big heavy thick necked florid young adults.

We now make a long oblique incision as I find we will need room because as you see the space between the last rib and the iliac crest is very small. As the incision is deepened we cut in turn the latissimus dorsi serratus posterior external oblique intercostal oblique and transversalis muscles. The transversalis is split carefully being taken not to wound the peritoneum. The perirenal fat is cut and torn through and it is with difficulty that the lower pole of a very high placed kidney is reached. The space between the twelfth rib and the iliac crest is too small for the hand. We therefore free the last rib of its muscular attachments being careful to avoid possible injury to the pleura with the bone-cutting forceps we remove about 3 inches of the

nb I find it somewhat awkward working behind the patient now so I change places with my assistant From this position it is much easier to insert the entire hand into the wound

As the organ is gradually freed from its bed a nodule is felt on the anterior aspect of the hilum This feels about the size

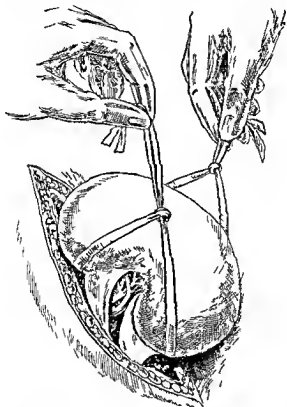


Fig 39—Sl g pport f th kd eyt f l tat t d l ry t th w d

and shape of one of the shadows I cannot as yet determine if it be within the kidney or not on fréting the posterior surface of the kidney and palpating the pelvis I can feel no calculi By gentle coaxing we now have the organ in view and can note a moderately large kidney with the evidence of fetal lobulations

tance from both ureteral lines. The roentgenologist was not satisfied that the shadows were in the pelves of the kidney and asked to take another view without the injection. This was done and the original three shadows were present. Thus seemed sufficient evidence that the shadows were very probably to quote the roentgenologist cast by renal calculi although as he stated he could not definitely place the upper shadow within the kidney shadow.

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In order to control the hemorrhage we now pass the left index and middle fingers under the kidney and behind the vessel while the ring and little fingers pass in front of the vessels and lie against the eleventh rib (Fig. 40). We select Brodel's line and make a small incision thus testing out my finger hemostasis which is found satisfactory. The kidney is now opened almost to both poles and because of the finger compression against the eleventh rib there is practically no hemorrhage. Exploration of the opened pelvis with the finger finds no stones and a catheter passes down both ureters without obstruction. We now sew the kidney with a round pointed curved needle threaded with catgut. We use interrupted sutures which completely control the bleeding. The kidney is now replaced and a split tube drain placed along its posterior border.

We still have to find the pathology in this case and as the patient was tender over the appendix we now turn the patient slightly backward and expose a badly diseased appendix by opening the peritoneum at the lower angle of the wound. This is surely the cause of this patient's trouble. As you see it is bound back upon itself as well as to the cecum with adhesions and shows a distinct and definite stricture. I remove the appendix in the usual manner and close the peritoneum. To guard against any possible leakage from the kidney reaching the peritoneal suture line a Mikulicz drain is placed just above the peritoneal suture between it and the kidney above.

The patient is not taking his ether well. He is cyanotic and full of mucus. The anesthetist reports his pulse as 160 and weaker. His skin is leaky despite his having had 1/50 gr of atropin.

Comment—As we look back on this case we naturally ask where our diagnostic reasoning was at fault. The history was that of renal colic the x-ray seemed to show three shadows in the pelvis although the roentgenologist was not at all sure whether the shadows were caused by calculi or calcified lymph nodes. The three points against a calculus diagnosis were the absolutely clean urine, the constant tender spot at McBurney's point and lastly the proof that the shadow down in the patient's

still visible. It is still impossible to bring the kidney out of its wound far enough to view the pelves because there is not room for the hand and kidney both to come through the space between the fourth rib and the iliac crest. We therefore make two slits with two strips of packing and easily deliver and hold the kidney in position (Fig. 39). Now by gentle dissection we push back the fat from the posterior surface of the hilum. This allows my finger to palpate well up on the posterior sur-

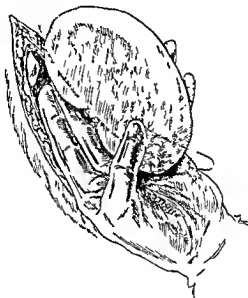


Fig. 40—Method of holding kidney in case

face of the pelves which as you now see are two in number. I find nothing suggestive of stone. The nodule felt before the delivery of the kidney I find is in the perirenal fat and is probably a calcified lymph node although I cannot visualize it.

Not finding the suspected stones in the pelves we next search the kidney by percussion in various directions with a small rounded pointed needle. Still unsuccessful and in view of the very good x-ray evidence it seems justifiable to open the kidney to see if possibly the stone might be hidden therein.

## HYDRONEPHROSIS

THE patient for operation consulted her physician some two weeks ago for persistent headaches associated with back ache and pain in her right iliac fossa. She stated that she was operated upon three years before for pelvic trouble and chronic appendicitis these supposedly causing her symptoms. At this time she had an ovarian cyst and the appendix removed.

Past Illness —About four weeks ago the severity of her back ache and headache coupled with pain over her gall bladder region led her to seek the advice of another physician who diagnosed her condition as one of gall bladder disease. She has had no digestive symptoms. Her feet and legs swell at times.

Condition on Admission —Patient is a pale undernourished female with rather a flat chest and prominent abdomen. She is slightly puffy under her eyes. Examination of the heart finds a mitral murmur. The abdomen is soft flaccid and there is some distasis of the recti. In the upper right quadrant there is a large mass corresponding to the gall bladder site. It is smooth firm dull on percussion rather freely movable in an upward direction and can be felt in the right loin. It is not connected with the liver as shown by the fact that it is little influenced by respiration and the examining hand can be passed above the tumor between it and the liver. It gives the impression of being about the size of a large orange. Both legs are slightly edematous.

On admission temperature was 98.4 F pulse 100 respirations 20 blood pressure 170/95.

Urinalysis shows specific gravity 1007 trace of albumin many hyaline and granular casts.

Tentative Diagnosis —(1) Nephrosis (2) Hydrops of gall bladder with an associated nephritis.

Cystoscopic Examination —Bladder normal indigocarmine appeared from left ureter in five and one half minutes but did not show from the right ureter for forty five minutes. A second



pelvis near the bladder was outside the ureter probably being a calcified lymph node

The patient reacted well and his pulse dropped to 110 in three hours. The second day he developed a bronchopneumonia and because of his extremely poor condition on the sixth day at the family's express request he was transfused. Both the patient and the donor, a brother, were Group II. They were also cross agglutinated and were again found compatible. He had a mild anaphylactic reaction from which he recovered. Three hours later he had a generalized convulsion, became unconscious, developed hemiplegia and died.

Double kidney is not a rare condition. Braasch and Schall report 144 patients with duplication of the renal pelvis and ureter observed at the Mayo Clinic. Of this number only 36 had complete unilateral duplication. They state that duplication is the most common anomaly in the urinary tract and is of course only of importance when pathologic or surgical conditions become associated as they are prone to do.

is an aberrant artery from the aorta that crosses in front of the ureter about 2 inches below the kidney stalk (Fig 41) Above this artery the ureter and kidney pelvis are enormously dilated in fact we may say they gradually expand into the enlarged kidney Below where the artery crosses it the ureter is normal in size and appearance

The vessels are clamped with two curved clamps  $\frac{1}{2}$  inch apart and doubly ligated with catgut proximal to the clamps The

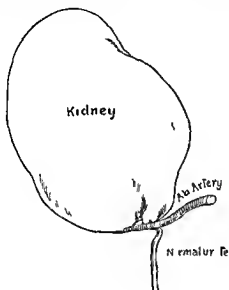


Fig 41—Illustration of the kidney showing the dilated pelvis and ureter above the crossing of the aberrant artery, and the normal ureter below the crossing.

pedicle is now severed near the distal clamp The proximal clamp is slowly released thus preventing any possible slipping of the ligature Were this pedicle a broad one it would be preferable to transfix through a space between the vessel and tie both ways The ureter is ligated severed and the stump touched with carbolic acid A split tube drain is placed down to the pedicle the sand bag removed and the wound closed in layers care being taken not to include in the stitches the dorsal nerve seen lying along the upper wound edge

cystoscopic examination confirmed the above with the additional findings that a No. 5 catheter could be passed up the right ureter for 20 cm. where it became blocked. No urine escaped through this ureter or catheter.

**x-Ray Examination**—Outline of right kidney is not clear. There seems to be a mass larger than a normal kidney. opaque catheter in right ureter reaches to upper border of fifth lumbar vertebra.

Kidney function shows phenolsulphonephthalein elimination for first hour 30 per cent, second hour 25 per cent. Blood nitrogen 22.416.

**Diagnosis**—Hydronephrosis due to a ureteral kink or aberrant blood vessel based on obstruction in the absence of x-ray evidence of calculus (not always conclusive) and the absence of renal colic.

**Operation**—Under gas oxygen anesthesia the patient is placed on the unaffected side with a sand bag under the loin and the right thigh and leg flexed the assistant pressing against the knee with his abdomen. This prevents the patient from rolling away from the operator. Because of the size of the kidney it is decided to employ the oblique lumbar incision as it admits of enlargement over the short ribs or down inside the iliac spine. The incision is begun between the twelfth rib and the erector spinae muscle about 2 inch below the rib and is carried down obliquely toward the anterior superior iliac spine cutting through the skin and fascia the *latissimus dorsi*, *serratus posterior inferior* and farther down the external oblique. The internal oblique is now cut across its fibers and its fascia lumborum split. The transversalis fascia now presents. This is slit well up in the wound being careful of the last dorsal nerve and the two fingers of the left hand are inserted in the incision and gradually slid under the fascia in the direction of the wound the scalpel at the same time dividing the fascia. The interposed fingers prevent peritoneal injury.

The large cystic mass is now delivered into the wound. This is found to be a greatly distended kidney. As the lower pole is raised we find a band stretching across toward the spine. This

is an aberrant artery from the aorta that crosses in front of the ureter about 2 inches below the kidney stalk (Fig 41) Above this artery the ureter and kidney pelvis are enormously dilated in fact we may say they gradually expand into the enlarged kidney Below where the artery crosses it the ureter is normal in size and appearance

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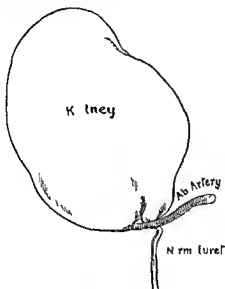


Fig 41—Illustration of the normal ureter and the aberrant artery crossing it. The diagram shows the kidney (K lney) and the normal ureter (N rm l uret) which is dilated above the point where the aberrant artery (Ab Artery) crosses it. The vessels are clamped with two curved clamps  $\frac{1}{2}$  inch apart and doubly ligated with catgut proximal to the clamps.

pedicle is now severed near the distal clamp The proximal clamp is slowly released thus preventing any possible slipping of the ligature Were this pedicle a broad one it would be preferable to transfix through a space between the vessels and tie both ways The ureter is heated severed and the stump touched with carbolic acid A split tube drain is placed down to the pedicle the sand bag removed and the wound closed in layers care being taken not to include in the stitches the dorsal nerve seen lying along the upper wound edge

The lesson we must carry away as a result of the study of this case is an important one namely that backache and discomfort in the right iliac fossa are not always due to pelvic conditions or appendicitis nor is a mass felt in the gall bladder region necessarily an enlarged gall bladder. Had this woman been properly studied by her previous medical advisers she would have been saved much suffering and a needless laparotomy. The diagnosis of chronic appendicitis causing symptoms requiring surgical intervention should be made by elimination. Our experience in this clinic is that before a chronic appendicitis exists a previous acute condition must have occurred and unless such a history can be elicited an appendectomy will not necessarily cure the patient.

Convalescence —Other than a slight infection in the wound the postoperative course was uneventful and the patient left the hospital in four weeks.

Follow up Report —Patient states three months later that she is enjoying perfect health and has had no headaches or backaches since her operation.

## DUODENAL ULCER EPIGASTRIC HERNIA RETROPERITONEAL APPENDIX ADVENTITIOUS BAND

THE patient for operation today is an adult male aged forty eight who comes to us complaining of epigastric pain nausea and constipation

Past Illness—Ten years ago he developed an epigastric hernia since which time he has had frequent attacks of pain and soreness in this region During the past two months the attacks have become continuous He now has pain after meals nausea belching of gas and hunger pain

Physical examination shows nothing of importance as far as his general condition is concerned until we reach the abdomen Here we find tenderness and rigidity of the rectus muscle in the upper right quadrant There is also some tenderness over McBurney's point The abdomen is somewhat distended

Tentative Diagnosis—Duodenal ulcer epigastric hernia

x Ray Report—Duodenal ulcer with marked gastric retention chronic appendicitis and no evidence of cholelithiasis

Operation—With the patient under gas oxygen anesthesia we now make a right rectus incision about 1 inches from the midline We come down at once upon the pylorus which is low lying The duodenum is very much injected and palpation shows marked induration for a distance of inches along the upper border In the center of this induration about 1 inch from the pylorus the crater of an ulcer can be felt The indurated condition of the tissues does not permit of excision nor a Horsley pyloroplasty nor much less a pylorectomy We must therefore institute stomach drainage by means of a gastrojejunostomy Before doing this we visualize by retraction the ileocecal region with a view to removing the appendix We now encounter a most interesting condition The appendix cannot be seen being completely retroperitoneal lying between the leaves of the ascending mesocolon The last 5 inches of the ileum

The lesson we must carry away as a result of the study of this case is an important one namely that backache and discomfort in the right iliac fossa are not always due to pelvic conditions or appendicitis nor is a mass felt in the gall bladder region necessarily an enlarged gall bladder. Had the woman been properly studied by her previous medical advisers she would have been saved much suffering and a needless laparotomy. The diagnosis of chronic appendicitis causing symptoms requiring surgical intervention should be made by elimination. Our experience in this clinic is that before a chronic appendicitis exists a previous acute condition must have occurred and unless such a history can be elicited an appendectomy will not necessarily cure the patient.

**Convalescence**—Other than a slight infection in the wound the postoperative course was uneventful and the patient left the hospital in four weeks.

**Follow up Report**—Patient states three months later that she is enjoying perfect health and has had no headaches or backaches since her operation.

surface. On close scrutiny however we see that this peritoneum is thinner more delicate more transparent and envelops the mesenteric vessels more closely than elsewhere along the ileum. In other words we have a peritoneal lined canal or open fossa behind the ileum. These bands are frequently found in the course of abdominal operations especially in women. It is our practice to cut them if the proximal gut is hypertrophied or the patient has symptoms referable to them.

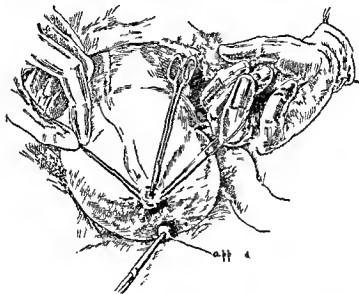


Fig 43—R t g d m al fth ppe d Th b fth pp d  
 d bly lgt l d d by t ry bet th l gat Th st mp  
 vagi t d by a p t g t e

The appendix is now freed at the base double clamped and severed with cautery. The stump is ligated purse stringed and invaginated (Fig 43). The appendix is now removed subperitoneally by scoring the peritoneum and stripping the appendix out of its bed clamping the arterial branches as they enter the appendix. This procedure is one we often use in subacute or chronic cases where the appendix is much swollen indurated and bound to surrounding structures low down in the pelvis.



with the exception of the inch proximal to the cecum is also bound down by the enveloping peritoneum to the posterior abdominal wall. This apparent retroperitoneal position terminates over the brim of the true pelvis. There is a pronounced retroperitoneal fossa behind each extremity of this bound-down ileum and a finger can be passed into one fossa through a post ileal canal and out the other fossa. Four or more inches of the gut is so bound down (Fig. 42).

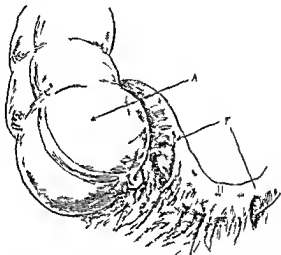


Fig. 4.—The distended ileum in the retroperitoneal fossa. A, Retroperitoneal fossa; F, distended ileum; B, distended ileum; C, distended ileum; D, distended ileum; E, distended ileum; G, distended ileum; H, distended ileum; I, distended ileum; J, distended ileum; K, distended ileum; L, distended ileum.

The ileum so imprisoned is small while the proximal free ileum is thickened somewhat hypertrophied and shows enough obstruction to account for the constipation complained of by the patient. We now divide the peritoneal band and free the ileum which is rotated on its long axis and as this rotation is corrected the gut is seen to distend. We now notice that the liberated gut has not been truly retroperitoneal as shown by the fact that we can see that it and its mesentery which is a very short one each have peritoneal covering on their posterior

delicate adjustment and consequently less trauma to tissues with the thumb screws than is possible with the other types of blade clamps. After approximating the stomach and jejunum sufficiently to allow a 3 inch suture line the posterior suture line is made with a curved needle. We now open the stomach and jejunum in parallel lines extending to within  $\frac{1}{2}$  inch of the extent of the first suture line. The leaking contents being sponged out and the redundant jejunal mucous membrane being pared off we start the through and through suture in the center of the posterior cut edges. This suture threaded with a needle on both ends takes in all the coats of the viscera and each end is carried around an angle of the gastro enterostomy being careful to lock or back stitch every third or fourth stitch. After the two ends have rounded the angles of the incision they approach each other and are tied in the center of the anterior suture line. This makes a much better and safer angle suture since there is not the danger of missing the wound edges as there is when one endeavors to complete the stitch and tie it at the angle. We now discard all soiled protective sponges change the gloves mop off the exposed viscera with warm salt solution and complete the first or outer suture line. The mesocolon is next stitched by three or four interrupted catgut sutures to the stomach along the anastomosis line and the whole returned to the abdomen. Attention is next directed to the epigastric hernia. Some writers state that epigastric hernias are so frequently associated with gastric disease that at the time of their repair the abdomen should be opened. This seems a little radical this being the only case in a series of 6 seen by the writer in which the patient clearly had gastric symptoms. In turning back the inner flap of the abdominal wound we notice a dimple in its peritoneum at the hernial site. This can be readily smoothed out although the hernial prominence still exists. In other words this is the type of hernia described by Moschowitz which is really not a hernia having no peritoneal covering. The skin and subcutaneous tissues are dissected back the mass exposed and found to be a fascia covered mass of preperitoneal fat. This is reduced a vessel which comes through the small orifice is ligated and the opening is closed with a

or behind the ileum without abscess formation. By this retrograde subperitoneal removal there is practically no danger of injury to other structures and there is decidedly less hemorrhage (Fig. 44).

Those of you who are near can see exposed through the peritoneal wound the iliac vessels and ureter. A catgut suture

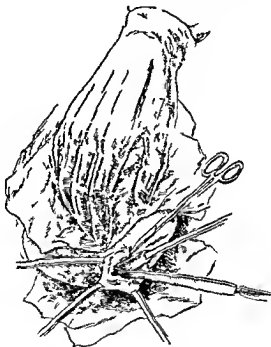


Fig. 44—The peritoneum is being stripped off the sero covering. The right iliac vessels are caught by the peritoneum.

draws the loose peritoneal edges to either laterally to cover the area denuded by the mobilization of the ileum.

A posterior gastrojejunostomy is next performed using absorbable gut without making a short loop and being careful to have the stoma in the jejunum opposite its mesenteric border. We are using a Bartlett clamp as we feel that we can get a more

delicate adjustment and consequently less trauma to tissues with the thumb screws than is possible with the other types of blade clamps. After approximating the stomach and jejunum sufficiently to allow a 3 inch suture line the posterior suture line is made with a curved needle. We now open the stomach and jejunum in parallel lines extending to within  $\frac{1}{2}$  inch of the extent of the first suture line. The leaking contents being sponged out and the redundant jejunal mucous membrane being pared off we start the through and through suture in the center of the posterior cut edges. This suture threaded with a needle on both ends takes in all the coats of the viscera and each end is carried around an angle of the gastro enterostomy being careful to lock or back stitch every third or fourth stitch. After the two ends have rounded the angles of the incision they approach each other and are tied in the center of the anterior suture line. This makes a much better and safer anastomosis since there is not the danger of missing the wound edges as there is when one endeavors to complete the stitch and tie it at the angle. We now discard all soiled protective sponges change the gloves mop off the exposed viscera with warm salt solution and complete the first or outer suture line. The mesocolon is next stitched by three or four interrupted catgut suture to the stomach along the anastomosis line and the whole returned to the abdomen. Attention is next directed to the epigastric hernia. Some writers state that epigastric hernias are so frequently associated with gastric disease that at the time of their repair the abdomen should be opened. This seems a little radical this being the only case in a series of 6 seen by the writer in which the patient clearly had gastric symptoms. In turning back the inner flap of the abdominal wound we notice a dimple in its peritoneum at the hernial site. This can be readily smoothed out although the hernial prominence still exists. In other words this is the type of hernia described by Moschowitz which is really not a hernia having no peritoneal covering. The skin and subcutaneous tissue is dissected back the mass exposed and found to be a fascia covered mass of preperitoneal fat. This is reduced a vessel which comes through the small orifice is ligated and the opening is closed with a

mattress suture overlapping the edges after the manner of a Mayo repair of an umbilical hernia

**Postoperative Course**—The patient had a smooth recovery from the anesthetic. He was placed on our routine postoperative treatment as follows. Fowler position morphine if restless or suffering nothing by mouth for six hours then increasing amounts of water followed by liquid diet milk excluded after twenty four hours. Proctoclysis by the drip method is given. The first pint is of tap-water containing 15 j of tincture of digitalis the second pint is 2½ per cent of soda bicarbonate solution and the third is 2 soda bicarbonate and 5 per cent glucose solution. If there is difficulty in voiding as there was in this case the patient is allowed to sit on the side of the bed or even allowed to stand up if the operation is one without drainage. The bowels are moved by an enema after seventy two hours. I may say that we have been following this routine for six months in all abdominal cases including peritonitis and intestinal obstruction and there has been a remarkable freedom from distention. These duodenal ulcer cases are all placed upon a modified Sippy diet during their convalescence.

**Follow up Report**—Patient states that his health is fine that his digestion gives no symptoms and constipation no longer exists.

**Discussion**—The formation of these adventitious bands is best explained by Hertzler from whom I beg to quote<sup>1</sup>. The older writers believed that when an organ had a mesentery and lost it it did so because the two layers of which the mesentery was supposed to be formed spread out (Fig. 45 a). Toldt has shown that what actually occurs is a fusion of one surface of the mesentery with the parietal wall (Fig. 45 b). The sketch explains just why in some cases after freeing the band at *a* we find a membrane still covering the mesenteric vessels whereas in the *a* cases these vessels are uncovered. Hertzler further states that it is a mistake to speak of fusion of layers of peritoneum in the early period of development. The truth is that what represents the mesentery is but a mesenchymal mass. At the time

of fusion these tissues are covered by a layer of embryonal tissue only slightly resembling adult peritoneum. The power of such tissue to fuse with like surfaces is much greater than in fully formed tissue. It would seem that Fig 45 a illustrates the findings in this patient.

So called adventitious membranes in the abdomen are still under much discussion with reference to their etiology. There are many arguments to support the embryonal or development origin and yet there are also some irrefutable facts that point to their development beginning after birth. The case reported below would indicate other than development etiology.

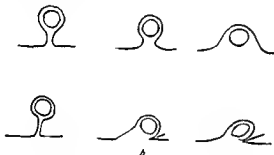


Fig 45—Aft H tsi Th l w t l d w g ll t t wh t w  
p bably th d t th ca

Case No 68 753 Referred from the Medical Division U of Pa Hospital W C aged nineteen with tentative diagnosis of subacute appendicitis. Operation through a gridiron incision a subacutely diseased appendix was removed. Following the routine examination of the abdomen the ileum was found bound to the posterior abdominal wall about 3 feet from the ileocecal valve. The band restraining it was about 2 inches wide and merged smoothly with the posterior peritoneum giving the impression that the ileum was retroperitoneal. On incising this band the ileum was found to be rotated on its long axis. As it rolled out into its normal position a diverticulum (Meckel's?) presented. This was about  $1\frac{1}{2}$  inches long was opposite the mesentery and had its own distinct blood supply. The micro

scopic report showed the full number of normal intestinal coats

If this was a Meckel's diverticulum it is evident its post ileum position must have occurred after birth and been caused by inflammatory adhesions

## ESOPHAGEAL DIVERTICULUM (CERVICAL)

THE case before us for consideration today has been referred by Dr Joseph Sailer from the Medical Service and Dr Chevalier Jackson from the Esophagosopic Service. It has been decided that surgical intervention is indicated. The patient is in such good condition that a preliminary gastrostomy is not required. The case is one of cervical esophageal diverticulum situated opposite the cricoid cartilage (Figs 46-47).



Fig 46—Anteroposterior view of the neck and upper thorax with the barium swallow.

**Operation**—Under gas ether anesthesia an incision is made on the left side of the neck along the anterior border of the sternocleidomastoid muscle extending from just above the sternum to  $\frac{1}{2}$  inch above the thyroid cartilage.

The incision is usually best on the left side as the esophagus



soon takes direction toward the left. In this case moreover the hismuth shadow seems to show the diverticulum also a little to the left. The severed veins are doubly ligated. The fascia is incised along the anterior border of the sternocleidomastoid muscle and it is retracted outward. After splitting the middle fascial layer the omohyoid muscle above is retracted upward and outward and the sternothyroid and sternohyoid muscles are retracted inward. Blunt dissection separates these muscles the full length of the skin incision. This exposes the thyroid



Fig 47—Lat ral f th di rt l m th th b n m t t

gland on the tracheal or inner side and the great vessels are easily felt on the outer aspect of the wound. The thyroid gland is drawn inward and its fascial covering incised well back and in the line of the trachea care is taken not to injure the recurrent laryngeal nerve which lies in the sulcus between the trachea and esophagus. The inferior thyroid artery now presents about the center of the wound. It is doubly ligated. Retraction and blunt dissection carries us down to the prevertebral fascia. As the trachea and esophagus with the laryngeal nerve lying in the

groove between them are retracted inward (Fig 48) the edge of what we take to be the diverticulum presents to view

At this stage rather than hunt for the sac blindly Dr Tucker passes the esophagoscope and with the light turned on inserts

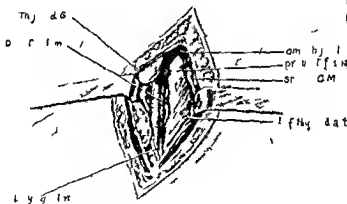


Fig 48—Illustration of the position of the diverticulum. The thyroid diverticulum is shown protruding from the esophagus. The diverticulum is shown in relation to the thyroid gland, the trachea, and the esophagus. The diverticulum is shown in relation to the thyroid gland, the trachea, and the esophagus.

it into the sac illuminating it very prettily. It will be noticed that the sac is high posterior to the esophagus about 2 inches long and very thin. The scope is now an led to present into the wound after the manner of Jackson and Gaub. The sac is now

grasped with an Allis forceps and carefully freed from the surrounding structures. This is very easily accomplished in this case (Fig 49 A B)

We have now to decide which method to employ whether the one stage or two-stage operation. The inability to pull the sac neck up to the skin edge without too much torsion of the esophagus decides us to employ the one stage operation.



Fig 49—A The esophagus with the diverticulum B method of closure C esophagus after operation

The width of the neck precludes using a purse string and its thin wall incline us to use the multiple suture line in approximating the sac into the esophagus rather than excising it.

Dr Tucker now passes the scope down the esophagus. This is accomplished with some difficulty due to the width of the sac neck and the obstructing posterior wall of the larynx. It is however finally accomplished after twisting the diverticulum on itself thus closing its wide neck. During these manipulations the top of the sac is torn. We now place line of No 00 chromic

catgut stitches of the continuous mattress type paralleling the esophageal long axis and turning in the apex of the sac. The suture is left long at each end to act as stay sutures until the next lower row is ready to invaginate (Fig 49 B). They are then cut and turned in by the next suture. Five rows suffice to reduce the diverticulum flush with the esophagus. In the last two rows we endeavor to keep the needle outside the mucous membrane lining the esophagus. The scope still in position prevents encroaching too much upon the normal esophageal lumen. A duodenal tube without the bucket is now passed into the stomach and the scope withdrawn. The sutures were placed longitudinally first because the strain on them is longitudinal through the stretch of the esophageal weight and second it is mechanically easier to so place them. Inspection of our work shows that the longitudinal suture line is posterior lying directly against the vertebræ (Fig 49 C). A further advantage of the straight suture line is that the tissue turned into the esophagus is in a thin flat shape rather than the hunch of tissue that the purse string suture would form.

A cigarette drain is now inserted behind the esophagus well below the suture line and another shorter drain is placed in the lower angle of the wound. Both are brought out the lower end of the wound the upper portion of the incision being sutured.

Murphy preferred a two stage operation. During the first stage the sac is freed, twisted and sutured. The wound is packed with gauze for twelve to fourteen days and the sac is then removed. C. H. Mayo employed the two stage operation, dissecting the sac without opening it, bringing it out of the wound and suturing the skin to the neck of the sac. Ten to twelve days later it is removed without an anesthetic and the edges turned into the esophagus.

The two stage operation with excision of the sac has given the lowest mortality. The one stage operation in the hands of several surgeons gave a mortality of 16.6 per cent in 60 cases reported by Stetten. Provided however the sac does not have to be excised or opened but can be turned in by sutures without danger of occlusion of the esophagus the one stage operation

is a good procedure. Bevan was the first to suggest a series of purse string sutures infolding the sac where it either atrophies or is sloughed off.

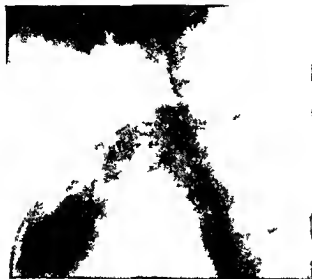
**Postoperative Course**—The patient was out of the anesthetic in two hours and could speak in a normal voice showing that the nerve had escaped injury. He was nourished by proctoclysis augmented after twenty-four hours by liquids through the duodenal tube. On the third day the duodenal tube became



Fig. 50—Ray t k f l w g ba m m i f l s f t th  
perat Th port t th d f d r t i m p s e t  
th t pot l t cal v w

blocked and had to be removed. Another tube could not be inserted and as the patient could not swallow, course was had to proctoclysis. On the eighth day the last packing was removed and the patient straightway wallowed better. Some temperature led to the suspicion of leakage although there was no external evidence until the ninth day following operation. This leak continued ten days and finally stopped twenty-one days after the operation.

It is interesting to note that the patient's voice left him on the fourth day and only began to return three weeks later



Fg 51— Ray t k f l l w g b m l f w k ft th  
perat Th port t t th d f d rt l m p se t  
th t pot l t l v w

x Ray examination five weeks after the operation shows a smooth esophagus (Figs 50 51) The patient was able to eat solid food with ease and the neck wound was healed



## SUPRACONDYLAR FRACTURE OF THE HUMERUS

THE first case for operation is a boy eleven years old who ten days ago fell and sustained a supracondylar fracture of his left humerus. An attempt at reduction was made in the Accident Ward under an anesthetic. An x ray taken the same afternoon showed a marked displacement the lower fragment posterior to the upper fragment (Fig 60 Case VI A). Due to the severity of the traumatic reaction swelling and bleb formation the limb was elevated and treated with evaporating lotions. Five days later we again attempted reduction under the fluoroscope and found that we could not engage the fragments nor obtain crepitus despite the fact that we could see clearly what we were trying to do. We judged that soft tissue in some way was interfering. Reduction by the open method was therefore decided upon.

**Operation**—Under gas oxygen anesthesia the extremity is given its second preparation on the table. We use 5 per cent picric acid alcoholic solution to paint from the shoulder to the wrist a sterile towel is now bandaged around the hand and forearm. With the elbow partly flexed we make a crescentic incision about 5 inches long extending from above on the external supracondylar ridge and curving down on to the external surface of the forearm. Wet towels are now sewed with a continuous silk suture over the skin edges being careful that no skin surface is left exposed. With a fresh knife the fascia and aponeurosis is incised through the laceration which you see and the hematoma at the site of the fracture is opened.

You will note that throughout the operation we are careful to use the sponges in Kelly hemostats or forceps thus minimizing the danger of hand infection. Furthermore I will not introduce my finger into the wound unless it is absolutely necessary for the determination of position of its fragments and only then after changing my gloves. Sponging out the clot and retracting the



wound edges we see the lower end of the upper fragment with a nerve looped around the broken surface. This nerve we take to be the musculospiral from its position and direction. On searching for the lower fragment we find it displaced well to the ulnar side and lying posterior to the upper fragment (Fig 52). The nerve is unlooped from around the bone and examined for injury. No gross lesion can be seen. We now endeavor by traction and manipulation to reduce the fracture. We find this is impossible and close examination discloses the fact that soft tissue in the shape of periosteum and fibrous tissue is interposed and overlaps from in front of the fracture surface of the lower fragment. By



Fig 52—Showing the difficulty of the interposition of the nerve hook and the upper fragment.

the use of a Lane angle iron for the lever we exert slow pressure. Here I might state that traction on a broken bone in which the shortening has existed for some days should always be overcome slowly. Rapid stretching shocks the patient severely. You now see that after two or three minutes the fragments are beginning to assume more nearly their proper relation. My assistant calls attention to the fact that the towel suture at the wound edge has slipped and the skin is exposed also that there is a small torn place in the little finger of my glove—two slips in technique which we proceed to correct. By traction on the flexed forearm the fractured surfaces slide into position. The tip of the angle-

iron carrying before it the interposed cuff of periosteum and fibrous tissue that is preventing the reduction (Fig 53) The

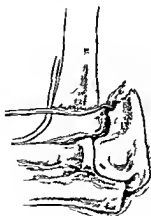


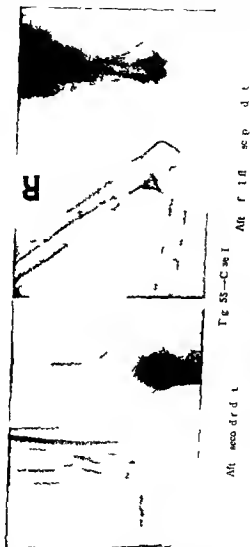
Fig 53—F gm t be g p d to pl aft th h be l d



Fig 54—R d t

fragments now stay in position and with the limb in the Jones position there is no tendency for them to become displaced (Figs 54 and 60 Case VI C)

You can see that the periosteum has been torn from the shaft



of the humerus being carried back by the attached muscles as we retracted them. In order to minimize the danger of excessive

callus formation the periosteum should lay close to its bone hence we drain the wound which is still oozing to prevent a subperiosteal hematoma

**Postoperative Course**—The day following operation it was noticed that the patient had a musculospiral palsy on the operated side. It must be confessed that the state of this nerve was not noted on his chart before operation a very grave oversight and fraught with the possibility of serious local consequences except for the fact that the patient states that he has not been able to raise his wrist or open his fingers since he broke his arm. We are therefore extricated from an otherwise uncomfortable situation



Fig 56—C II

Ant. pos. det.

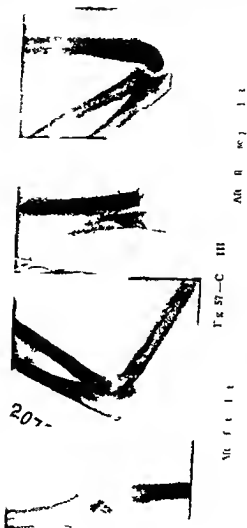
Ant. lat. scap. fin. lat.

There developed a slight infection in the wound which might be accounted for by one of the slips in technic mentioned above. This rapidly cleared up with one Dakin tube. The wrist was dressed with a cock up splint.

**Follow up Report**—Two months after the operation examination finds the wound healed and partial return of nerve function as shown by ability to partially extend the wrist and fingers. The elbow has about 45 degrees of motion in back flexion and extension beyond the right angle position.

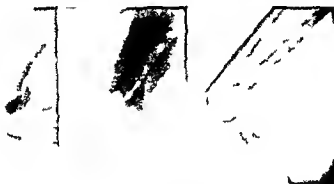
**Comment**—When one of these fractures is admitted to our service at the University of Pennsylvania Hospital it is immedi-

ately taken to the x ray department and reduced under the



fluoroscope with the patient under an anesthetic. Should the

fluoroscope not be available for some hours the reduction is attempted without it and the limb put on an internal right angle splint. This splint is used for two reasons—it permits x ray views to be taken in both lateral and anteroposterior directions which the Jones position will not allow readily and it reduces the danger of the swelling around the elbow interfering with the circulation to the forearm and hand. Should the case come to us in poor position after one attempt at reduction a second reduction is always attempted by us with the aid of the fluoroscope. In order to prevent being burnt by the rays the



A B C  
Fig 58—Ca IV Aft fl p d t

various men on the staff alternate when the cases come closer together than two weeks.

In the last six months 10 of these cases have come under my care in two hospitals. 5 of which (see Figs 55-59) had had one or more previous attempts at reduction before coming to the hospital. In only one was there the least difficulty experienced in the reduction under the fluoroscope the results of which are seen in the illustration. The one case of difficulty was the one reported operated upon in this article (Fig 60 Case VI).

No recent case is operated until a fluoroscopic reduction has failed to such an extent as to jeopardize good functional result.

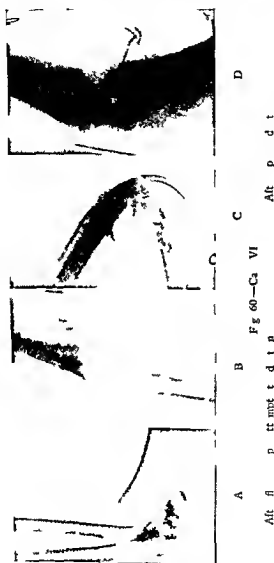
I wish to call your attention to one more fact before we dis-

miss this subject osteogenesis following bone injury in this region is exceedingly active and apparently is stimulated *passu*



*passu* with the degree of the subperiosteal injury. At least we can say that those cases of marked displacement and large hematomas have resulted in marked periosteal overgrowth.

This is shown very definitely in illustrations of Cases V A and



D and VI C and D One case in particular (Case IV) suffered



as a result of this activity. Here the hematoma apparently became ossified and united the ulna and humerus by a bony bridge which was complete, causing bony fixation of the joint. This bridge of bone was broken by the passive motion given by the physician.

## CONTRIBUTION BY DR J LESLIE DAVIS

ST AGNES AND ST MARY'S HOSPITALS

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### FREQUENT EFFECTS OF MORBID TONSILS NOT COMMONLY RECOGNIZED

THAT there is a multiplicity of disease processes in the human body which may owe their existence to the influence of morbid faucial tonsils has been widely commented upon sanctioned by some and scouted by others but I think there can be no doubt in the mind of all unprejudiced observers that the full significance of the problem is still but slightly appreciated

The stumbling block to many is found in the fact that only acute tonsillar infections present distinctive symptoms or characteristics while the morbid tonsil of indefinite chronicity may be inconspicuous in physical appearance diverse in its modifying influence and wholly void of local subjective symptoms

Fortunately the great principle of focal infection seems now to be generally recognized and its application in the cure and prevention of disease will be rendered more and more practical in proportion to our appreciation of the chief sources of latent sepsis

My purpose therefore in this discussion is to bring to your attention a few pathologic processes which from clinical observation I have found occurring with such remarkable constancy in connection with morbid tonsils and have appeared also to show a like uniformity in response to the removal of the septic source as would seem to justify a reasonable assumption of an important etiologic relationship

The several conditions that I shall now present will be considered merely from a clinical standpoint and that briefly without attempting to account either for the mode of attack or for the histologic changes that may ensue calling attention only to such familiar appearances and associated symptoms as might render the phenomena discussed easily recognized

The first class of cases I shall designate as *Disturbances of regional circulation interfering perhaps with nutrition and elimination and causing disorder of function of certain highly sensitized and specialized tissues*. The most common example of this condition may be observed in the very familiar appearance of the membrana tympani in the chronic dry form of catarrhal otitis media. The transformation from the normal translucent lustrous membrane is usually a very slow process the earliest detected macroscopic appearance being a faint cloudiness or foggy appearance which unless intercepted may grow gradually more and more dense and lusterless till its eventual appearance is not unlike ground glass or in some cases it partakes more of a creamy or ivory like appearance. This condition frequently designated as thickening of the drum membrane I am convinced is due to the protracted influence of morbid tonsils in a large majority of cases. It is a phenomenon to which I have paid particular attention for many years and never have I found the aural condition without the presence unless previously removed of diseased faucial tonsils. I have watched the slowly progressive character of the clouding over a period of many years where the cause was not removed and I have not seen with but few exceptions any perceptible further advancement of the process after enucleation of the tonsils many cases having been examined as long as ten to fifteen years after and I know of no measure however that will restore the normal translucency and luster of the membrane or remove the cloudiness or thickening in the slightest degree when once the change has occurred. Such alteration in the drum membrane of course is not the full extent of damage effected by this focal infection process but is usually associated with structural changes in other parts of the aural mechanism—the combined effect of which usually brings about defective hearing varying in degree according to the extensiveness and intensity of the disease. There is little doubt that a large percentage of so-called deafness of old age would have been obviated by the timely removal of a tonsillar focus of infection.

Cataracts.—Tonsillar infection plus intranasal pressure I be-

have may be found to be a frequent factor in the etiology of progressive cataracts. This opinion while in a large measure hypothetical is based upon observations in several cases of senile cataract during the past six years the characteristic behavior of obstruction plus focal infection in some other tissues and the opinions of some ophthalmologic authors of wide experience regarding the frequent association of cataract with focal sepsis with its variously albed complications. Henry Kirkpatrick<sup>1</sup> in his recent text book states Gastro intestinal disturbances and oral sepsis are wide spread in the tropics and most observers must have been struck by the frequent association of these conditions with incipient cataract in India.

The frequency with which refraction errors of the eye are found to be aggravated by intranasal pressure and obstruction in the ethmoidal area is of interest compared with the following quotation from Kirkpatrick. An eye the subject of an error of refraction appear to be specially liable to the ocular complications of diabetes nephritis and focal sepsis and if this be so it is only to be expected that such an eye would be exceptionally susceptible to cataract formation should a constitutional cause of the disease be present. And again we find in the same book this statement near the end of the chapter on Etiology of Cataract. The cause when present in a sufficient degree may produce an opacity by bringing about a degeneration either of the lens fibers or of the capsular epithelium. It may directly affect the cells or it may produce a disturbance of the function of the structures responsible for the nutrition of the lens fibers and capsular cells. Products of metabolism are allowed to accumulate which are either directly harmful to the fibers and cells or which may become so in the presence of more local factors such as light rays of short wave length.

I admit almost utter unfamiliarity with most ocular diseases except in their relation to conditions coming within the sphere of rhinolaryngologic practice my interest in 3 patients afflicted with cataract having been coincidental. All were men with fairly well advanced senile cataracts when they came to me for treatment of nose and throat conditions. The first one sixty

four years of age was first seen six years ago the second one aged sixty five first seen three years ago and the third one aged fifty examined six months ago. Each of these cases had remarkably similar nasal obstructions and each had diseased tonsil. High septal deflections with markedly enlarged middle turbinates tightly wedged against the septum but actually attached with synechial adhesions to the maxillary wall. Each patient was under the care of an oculist and was expected in the course of a few months to have to undergo operation for the cataracts. For relief of certain reflexes and systemic disturbances seemingly due to the septic tonsil and nasal abnormalities I removed each patient's tonsils one middle turbinate and straightened the septum by submucous resection under general anesthesia. Results. Each patient obtained marked physical improvement which has been permanent all still have as good vision as before operation without anything further having been done to their eyes though the last one was too recent to be of significance. The results in these 3 cases of course do not prove anything but are not without significance and suggest the advisability of looking into other cases especially those of less advanced stages of cataract to determine in what proportion may be found similarly combined conditions of tonsillar infection and nasal obstruction particularly that type of obstruction with marked pressure which might disturb the blood or nerve distribution in the neighborhood of the orbit.

A second class of cases are those where the influence of tonsillar sepsis manifests itself by reducing the vitality of certain more or less circumscribed areas of mucous membrane favoring superficial ulceration and followed in some instances by the invasion and further destructive influence of pyogenic infections.

The larynx represents one of the field most susceptible to the effects of septic tonsils. The site of inflammatory complications in the course of acute infection of the tonsils is more generally recognized than the fact that hemorrhagic laryngitis owes its perpetuation in majority of cases to septic processes within the common type of chronically morbid tonsil. The membranous tubes of the epiglottic infection extend to the

ventricular folds and even the vocal cords are the most frequent sites of infiltration. While laryngeal tuberculosis occurs in a majority of cases secondary to a pulmonary infection primary infections are occasionally encountered and I believe it not improbable that the tonsils are a potent factor in each class. It is furthermore reasonably certain that with a fuller appreciation of the resistance reducing influence of tonsillar sepsis on general vitality as well as that of some of the more susceptible circumscribed tissues skilled tonsil surgery could be made one of the most powerful factors in the fight against the great white plague.

The following is illustrative of the laryngeal primary lesion. Male aged thirty six years referred to me on January 22 1919 with the history of having first developed a persistent hoarseness about a year previously ulceration of the epiglottis which soon followed had gradually grown worse and laboratory examination had verified a diagnosis of tuberculous ulceration. His previous treatment had consisted of local palliative applications which were but slightly effective and constitutional measure but the patient was constantly losing weight and the pain was beginning to grow rapidly worse. No pulmonary lesion was detected. The feature of importance observed in my examination besides an extensive active ulceration of the epiglottis and marked infiltration of the interarytenoid membrane was the existence of submerged spongy tonsils of moderate size expelling a semisolid grayish substance on pressure.

Briefly tonsillectomy under general anesthesia was decided upon and carried out two days later without complications convalescence was normal from the tonsillectomy and in three weeks time the epiglottis had completely healed. The patient was last seen April 26 1920 in perfect health and normal weight and the larynx looked normal except for the irregular edge of the epiglottis.

Another type of laryngeal infiltration that is apparently a manifestation of morbid tonsils of which several cases have come under my care I believe to be typical of the condition which Chevalier Jackson has so aptly described as representing

a precancerous stage of laryngeal cancer. I quote from his most illuminating and practical article as follows:

The tonsil has long been recognized as the fountain head of a majority of the cases of disease of the throat. It has not heretofore been accused of causing cancer of the larynx but we all know that a focal infection in the tonsil can be the chief etiologic factor in chronic laryngitis and if we admit as I think we should that chronic laryngitis can be a precancerous condition we must admit that a diseased tonsil can be a cause of cancer. Tonsillar disease is certainly often overlooked in persons of cancerous age.

While we must recognize the impossibility of proving in any case what would have been the ultimate character of an unchecked progressive process which from its beginning to the time of its interruption appeared in all respects to correspond to the classical symptoms of incipient cancer of the larynx (chronic hoarseness, fixation of one vocal cord with eversion of the ventricle on the same side) it is at least significant that each of my cases, 3 in number, exhibited such circumstantial evidence that all had well marked septic tonsils that the 2 operated on made almost perfect recovery of the normal function of the larynx within a few months after the tonsils were enucleated and without recurrence. The third case, a woman sixty-four years of age, was seen only a few days ago for the first time and the recommended tonsillectomy has not yet been performed. The recovery of normal voice following tonsillectomy in adults who had suffered varying degrees of chronic hoarseness is of course not unusual. Following a report of one of the cases of what I now regard as precancerous laryngitis previously referred to:

Male, aged fifty-five years, was referred to me on June 9, 1919, by Dr. John E. Grube.

My letter written to Dr. Grube on the day of my examination may give briefly sufficiently the picture of the gross appearance to be recognizable to the opharyngologist seen similar conditions.

Dear Doctor Grube

In my examination today of Mr S whom you kindly referred to me I am hardly willin to make an unconditional diagnosis but am afraid that the condition is carcinoma of the larynx I did not give him an opinion since he was going to Atlantic City for a week's rest but told him that I would report to you and for him to stop by and see me again on his return at which time I would likely be able to tell him more about it The left vocal cord is fixed there can be seen a condition of infiltration of the ventricle and surrounding tissues on that side and the method of onset is characteristic Have you ever had a Wassermann examination made for him? Two other conditions that might rarely produce somewhat similar symptoms are syphilis and tuberculosis but it does not look like either Of course any pressure that might interfere with the left recurrent nerve could produce the fixation of the cord and I would like to know whether you have found any condition of aneurysm or anything in his past history that might throw any light on the situation He tells me that he has been losing weight He has rather badly diseased faucial tonsils and by transillumination both ethmoidal areas are considerably congested but I hardly believe these conditions could account for the laryngeal condition I shall appreciate any light that you may be able to throw upon this condition in order that I might if possible be able to make a definite diagnosis when I see him again

J LESLIE DAVIS

The following report was received on June 18 1919 from Dr Willis F Manöes

Dear Doctor Davis

I beg to report as follows in the case of Mr S I am unable to find evidence of lesion in any of the accessory sinuses I am sending herewith the films which I think are sufficiently clear to further support my opinion with regard to them I also made a fluoroscopic study of the chest but found no evidence of pathology that could in any way affect the recurrent



laryngeal The view of the larynx shows no abnormality which could be seen by means of x ray plates That there is no unusual hardening of the cartilages nor as far as I can see destruction of any of the tissue in this region

Yours very truly

W F MANGES

Blood examination made June 18 1919 by Dr E D Funk was as follows

Patient—Mr S Specimen—Blood

White blood-cell 8600 polymuclear 53 per cent large mononuclears 4 per cent small lymphocytes 39 per cent eosinophil 2 per cent

The red cells are apparently normal in their morphology and staining reactions

The Wassermann rum test was *negat*

Respectfully submitted

E D FUNK

Mr S had been conscious of slight hoarseness for several months which had become gradually more and more pronounced until for the past month his voice was extremely husky He had not suffered any pain nor had there been but little cough and that intermittently general health had always been fairly good and he had never had rheumatism Had been steadily losing weight for several months

Tonillectomy was performed on June 30th under nitro-oxid ethyl anaesthesia his convalescence was uneventful In ten days time the patient stated that his throat was distinctly more comfortable than before operation in that he could speak with greater ease

The patient was next seen on November 1st when the following notes were made Left vocal cords almost normal in point of physical appearance and in movement on phonation voice nearly normal I had not seen or heard further from him till today when in reply to inquiry sent to Dr Grube I received the following statement Mr S enjoys perfect health and his

larynx seems practically normal in talking to him over the telephone a few minutes ago I could not tell that there had ever been anything wrong with his voice

One of the most frequent locations for simple ulcerative processes and usually uncomplicated by mixed infections is the somewhat circumscribed area on the anterior surfaces of the nasal septum it may be unilateral or bilateral characterized by atrophy of the mucous glands hemorrhage of varying degree and frequency according to the depth of ulceration and particular location with respect to blood vessels and occasionally eventually leading to perforation of the septum Such perforations may be hastened by syphilitic complications and before the discovery of the Wassermann test doubtless was attributed many times unjustly to that cause These cases vary in their disturbing features from the patient's standpoint from a simple annoyance owing to the dryness crusting or scabbing provocative of the nose picking habit with occasional slight nose bleed to frequent prolonged hemorrhages that ultimately may bring about a state of marked anemia rendering more difficult the task of stopping each hemorrhage and each hemorrhage further aggravating the anemia

The following case will illustrate a severe type of septal ulceration

Male aged forty nine years was referred to me in September 1919 by Dr C B Warden with the history of having been subject to nosebleed for the past fifteen years the condition having gradually become more and more aggravated until according to the patient's statement he had not missed a day without hemorrhage for the past year During recent years he had been regarded as a hemophiliac though there was no family record to that effect On removing the packing which had controlled a severe hemorrhage the previous day I found the anterior septal surface of each side in area almost the whole cartilaginous portion had a granular appearance than but without any entirely denuded area of cartilage The very free hemorrhage which ensued was checked by repacking In my further examination the faucial tonsils larger than the average adult size of

laryngeal The view of the larynx shows no abnormality which could be seen by means of x ray plates That there is no unusual hardening of the cartilages nor as far as I can see destruction of any of the tissues in this region

Yours very truly

W F MANGES

Blood examination made June 18 1919 by Dr E D Funk was as follows

Patient—Mr S Specimen—Blood

White blood cell 8600 polynuclears 53 per cent large mononuclears 4 per cent small lymphocytes 39 per cent eosinophils 2 per cent

The red cells are apparently normal in their morphology and staining reactions

The Wassermann serum test was negative

Respectfully submitted

E D FUNK

Mr S had been conscious of slight hoarseness for several months which had become gradually more and more pronounced until for the past month his voice was extremely hoarse He had not suffered any pain nor had there been but little cough and that intermittently general health had always been fairly good and he had never had rheumatism Had been steadily losing weight for several months

Tonillectomy was performed on June 10th under nitrous oxide ether anesthesia his condition uneventful In ten days time the patient stated that his throat was distinctly more comfortable than before present in that he could speak with greater ease

The patient was next seen on November 1st when the following note was made Left vocal cord almost normal in point of physical appearance and in movement in phonation voice nearly normal I had not seen or heard further from him till today when in reply to inquiry as to Dr Grube I received the following statement Mr S is enjoying perfect health and his

hoped that they will for a while make their observations in the reverse order for by their fruits ye shall know them!

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zabl p ca co d t ? A l f S g ry f lxx J ry 1923
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- O f d Med cal P ss

morbid tonal were of the very soft mushy type almost concealed by overreaching anterior pillars and containing in considerable quantity a grayish liquid of creamy consistence. The patient's hemoglobin was 45 per cent and the clotting time six and a half minutes. The tonsils were enucleated a few days later under general anesthesia without difficulty of controlling hemorrhage—except for the matter of ligating several more than the usual number of vessels that we are accustomed routinely to tie following every tonsillectomy. Effect on septal ulceration. Local repair processes could be detected within a few days healing of the tonsillar fossae was complete in two weeks by which time nasal packing was discontinued and within six weeks the previously ulcerated septal surfaces were covered by healthy cicatricial tissue and the patient showed marked physical improvement.

Thus when we contemplate the variability in the manner of toxic distribution and the diversity of disease processes resulting directly indirectly or ultimately from focal infection within the cryptic recesses of morbid tonsils it would be difficult to comprehend the mental processes of those who are still occasionally heard to express alarm over what they term ruthless sacrifice of innocent tonsils were it not so evident that they have in most instances innocently formed their prejudices concerning the removal of tonsils from the pitiable results of censurable surgery. It is not the tonsils that are in need of a savior so much as it is the operator devoid of instruction but with no dearth of temerity.

Dental sepsis has been thought by some a cloacal of the morbid tonal for supremacy in the capacity of toxic distribution but if all faulty tonsils were eliminated in early childhood pyorrhea apical abscesses and associated carious condition would soon become a negligible force for I am persuaded that the faucial tonsils are important in the earliest influence toward dental decay.

If then there still continue to be some who find comfort in their cloak of so-called conservatism simply because the tonsil seems so unoffending in its placid appearance it is to be

## CLINIC OF DR P G SKILLERN JR

UNIVERSITY OF PENNSYLVANIA MEDICAL SCHOOL

### CASE I SUBMAXILLARY SALIVARY CALCULUS IMPACTED AT GLAND ORIFICE OF DUCT SIALOADENITIS CHRONIC ABLATION OF SALIVARY GLAND

*Summary* History of calcification of submaxillary gland, 1917. Examination of the gland, 1918. History of the case.

T M FEMALE aged twenty five stated that on May 14 1917 she noticed for the first time a swelling beneath the angle of the right side of the mandible this swelling has undergone rapid increase and diminution in size—particularly at meal time—but has never entirely disappeared but on the whole has slowly grown larger She has not noticed any definite cutting pain beneath the tip of the tongue The swelling causes inconvenience by giving rise to pain at times and interfering with speech and deglutition

Physical examination on May 14 1918 reveals a tumor the size of an English walnut corresponding to the position of the right submaxillary salivary gland This tumor is hard but not adherent to surrounding structures the overlying skin is neither red nor inflamed When the patient opens her mouth and curls the tip of her tongue back a drop of turbid fluid with white flakes appears at the orifices of the duct of Wharton on the right side this drop is made larger by pressure upon the enlarged submaxillary salivary gland

Operation (May 15 1918)—Ether Curved incision made as for ligation of second portion of lingual artery beginning just below right angle of jaw passing down to hyoid bone



May 22d (one week after operation) Sutures removed a small amount of thin fluid came out through the suture holes

Pathology —A calculus the size of a pea was found blocking the gland orifice of the duct of Wharton (Fig 61) The gland itself was knobbed and indurated

Comments —Jones<sup>1</sup> reports a case of large calculus embedded in the submaxillary gland in an acromegalic His analysis of numerous articles reveals a characteristic set of symptoms The primary symptoms are sudden onset of pain in the floor of the mouth over the submaxillary region or that of the other salivary glands associated with swelling and exquisite tenderness all increased by food and mastication

Physical examination is aided by bigital palpation and x ray examination Ivy states that a large dental film placed horizontally between the teeth as far back as possible with the rays directed from beneath the chin will usually reveal the calculus In severe cases the floor of the mouth is very swollen and tender so that speech and deglutition are painful as in our case Abscess of the affected gland may be present with necrosis and even fistula formation and cases have frequently been diagnosed as carious teeth with root abscesses to be contradicted by x ray

Illustrative of these possibilities is a case under treatment at the present time a doctor's son who presented himself with a large indurated abscess beneath the mandible, and pointing in the submental space very much like Ludwig's angina The abscess was incised where it pointed giving exit to pus with an odor resembling the colon bacillus infections Skiagrams of the teeth revealed no dento alveolar infection As time went on the discharge of pus cleared up but a mucoid material resembling saliva was discharged in small amounts from the incision and when the latter scabbed over this fluid dammed itself back along the floor of the mouth causing edema and tenderness of the plica sublingualis these signs subsiding upon removal of the scab and evacuation of the mucoid fluid No calculus was detected by x ray A month or so later the patient



and terminating 1 inch to right of symphysis of jaw dividing skin, superficial fat and platysma and exposing deep fascia. Superficial veins clamped and ligated. Deep fascia capsule of salivary gland divided and retracted exposing gland itself. By blunt dissection the gland was freed on all sides externally. The facial artery was encountered and drawn aside. The duct of Wharton was exposed by raising the posterior border of the



Fig. 61.—Salivary calculus impacted in gland free of Wharton's duct

muscle by dividing it and was divided  $\frac{1}{2}$  inch from the gland. The platysma and deep fascia were closed with interrupted sutures of No. 1 chromic gut. The skin edges were apposed by a continuous suture of horsehair. A rubber-dam drain was placed in outer angle of wound. Dry gauze dressing.

Postoperative Notes (May 16th day after operation)  
Drain removed

## CASE II FRACTURE OF SEMILUNAR CARTILAGE OF KNEE WITH FRINGE PINCHING ABLATION OF CARTILAGE RECOVERY

H P MALE aged forty two machinist was referred by Dr W Horace Means surgeon to the Bethlehem Steel Company with the history of having twisted his right knee while at work several months previous to the time of the examination on August 12 1922 He now complains chiefly of sharp pain in the knee on extension and also of pain that keeps him awake until about 2 o'clock in the morning Physical examination only revealed a localized spot of tenderness where the inner border of the ligamentum patellæ crosses the anterior edge of the articular surface of the tibia Damage to the internal semilunar cartilage was suspected and exploration of the knee joint was advised

Operation (August 13 1922) —Ether Horizontally curved incision made through skin and fasciæ lowest point of convexity reaching to midway between patella and tubercle of tibia Flap dissected up Quadriceps tendons patella and ligamentum patellæ divided in Z shaped manner the two resulting flaps being reflected with excellent exposure of the joint structures Examination of the internal semilunar cartilage showed that it was split at its anterior extremity and in addition there was flattening of two synovial villi which lay upon the upper surface of the cartilage in a position to be pinched between it and the femur thus accounting for pain on extension of the knee The entire internal semilunar cartilage was ablated together with the hypertrophied synovial membrane at its anterior extremity including the pinched and flattened villi Bleeding checked by hot normal saline solution Z shaped flaps of quadriceps tendon patella and ligamentum patellæ apposed and sutured with interrupted sutures of No 2 chromic gut Semilunar superficial flap sutured with interrupted sutures of silk

returned with a small swelling at the site of the previous incision. On lancing the swelling seropus escaped which when looked at in the pus basin revealed a few of the sulphur granules typical of actinomycosis infection. Microscopic examination showed the ray fungus.

used Patent still walks with crutches Owing to the patient's excessive weight complete restoration of function is not expected before the end of the sixth month after operation

Notes from Dr Means (December 22d—four months after operation) P—is working as a watchman but with seeming difficulty He complains of a fairly constant pain—made worse by use—below the knee anteriorly and under the scar this pain prevents him from ascending steps in the normal fashion and forces him to ascend one step at a time He also says that he cannot bear his full weight on the leg in the fully extended position but must partly flex the knee He speaks of a weakness in the internal aspect but says the former pain over the internal meniscus has disappeared The leg appears swollen especially above the knee but the patient states the evening swelling is not so great as formerly The leg feels better when tightly strapped so I have ordered him an elastic bandage with a pad over the internal aspect of the knee I believe his excessive weight has a good deal to do with his inability to use leg properly and I hope by plugging away with baking high frequency and massage we will attain the desired result

Comments—Exploration of the knee joint or exploratory laparotomy as it has been aptly termed is an operation that should be more frequently employed The living pathology of this joint has not been worked out so fully as that of the abdomen because there is still a tendency in the traumatic cases that drag along into the subacute and chronic stages routinely to employ the time honored plaster of Paris fixation and crutches We recall a patient who had been treated by these measures without relief and whose knee upon exploration revealed extensive hypertrophic villous synovitis excision of the involved portion of the synovial membrane together with the hypertrophied villi resulted in cure with excellent function (For full report of this case see *International Clinics* vol. IV 31st series 1921 p. 61)

Another case emphasizing the importance of free exposure of the joint by exploratory arthrotomy in obscure cases is the

worm gut Rubber-dam drain inserted at each angle of wound between superficial and deep flap but not extending into joint Copious dry gauze dressing applied Limb securely bandaged from foot to hip

Postoperative Notes (August 14th twenty-four hours after operation)—Has had sharp throbbing pain in knee since coming out of ether Dressed Rubber drains removed much serosanguineous discharge on dressing from mesial subcutaneous drain Buck's traction (10 pound) applied Ice-cap placed on knee Temperature 100 F pulse 88

August 15th (forty-eight hours after operation) Pain less only has throbbing at intervals Slept fairly well Bowel moved by enema Temperature 99 $\frac{1}{2}$  F pulse 82 respiration 22 Girth of thighs 3 inches above joint Right 21 inches left 20 inches Laid diet

August 16th (third day after operation) Pain and tenderness less Temperature 99 F pulse 80 respiration 20

August 17th (fourth day after operation) Temperature 98 $\frac{1}{2}$  F pulse 82 respiration 22 Pain and tenderness less Wound examined and found clean moderate reactionary swelling patella not floating girth—3 inches above joint—1 inch increased

August 20th (seventh day after operation) Temperature 98 F pulse 80 respiration 20 Bowels moved freely by calomel and salts Stitches removed healing *per primum* throughout Buck traction removed Motion present and painless

August 23d (tenth day after operation) No pain on extension of knee as before operation Girth—3 inches above joint— $\frac{1}{2}$  inch greater than left limb Up out of bed on chair

August 25th (twelfth day after operation) Up and about on crutches Discharged from hospital and sent back to Lebanon

September 17th (five weeks after operation) Can flex knee to 35 degrees Has had no pain on extension of knee similar to that which was present before operation There is still some edema of knee and leg Malaise and passive motion are being

the quadriceps tendon patella and ligamentum patellæ may be considered a rather formidable procedure in fact it does look formidable at the operating table but the wound heals promptly and without any permanent injury to the joint Better than the midline incision of Robert Jones however is the Z shaped method employed by Murphy which affords more satisfactory exposure of the deeper recesses of the joint

Objection has been raised to the transversely curved superficial flap on the ground that gangrene might occur when the flap is dissected to some distance above the patella Gangrene is not apt to occur however if one has the lowest point of convexity of the flap opposite the midpoint between the patella and the tubercle of the tibia and also if one takes care when raising the flap to dissect the fat cleanly from the underlying deep fascia and aponeurosis thus safeguarding the superficial blood vessels

Immobilization in plaster of Paris is not indicated after exploratory arthrotomy of the knee provided the anterior crucial ligaments are intact for it militates against the early resumption of motion by the joint Buck's traction is indicated for about ten days to keep the synovial surfaces apart to counteract muscle contraction and to effect a compromise between absolute immobilization and unchecked mobility

If hemarthrosis appears after operation early aspiration should be done

following. A machinist aged eighteen years stated that five months previous to admission while at work he jumped down 3 feet on to a plank which gave way and he landed on his left knee which was thrown into flexion. He got up and found his knee out of control and a lump appeared on the outer side. The joint soon began to swell. He was put to bed for ten days but no traction was applied. At the time of admission he is able to walk on the knee but it plays out, it slips and throws him and remains swollen. Something slips at the side and the patient goes forward; if it goes back with a distinct click the patient is able to bend his knee again; otherwise he cannot. Physical examination showed no apparent swelling; the landmarks and bony prominences were clear and distinct. There was a tenderness (a sickening sensation) on pressure over the anterior third of the lateral surface of the external condyle; less over the internal condyle; still less over the ligamentum patellæ. X-ray examination negative. Exploratory operation revealed on the outer face of the external condyle—just below the outer patellar ridge—a fragment of cartilage covered bone the size and shape of a small lima bean, broken off and remaining movable within the limits of a few fibrous bands that held it against the femur. The synovial membrane in relation with this fragment as a center was red and velvety from irritation; there was however no excess of synovia in the joint. The cartilage covered bony fragment was removed. Both semilunar cartilages were carefully examined but found intact.

If one should start out with a preconceived diagnosis of injury to a semilunar cartilage make the usual limited and confined incision for the removal of the latter and not find the cartilage definitely injured one would have to close and then make the free exploratory arthrotomy incision. Again as pointed out by Smith a true lesion of the semilunar cartilage may be associated with a tear in the anterior crucial ligament. It is therefore conceivable that ligation of the semilunar cartilage alone without further exploration has been responsible for a certain number of failures even when a torn semilunar was definitely repaired (Rosenberg). Milne plotting of

### CASE III METASTATIC CARCINOMA OF CERVICAL LYMPH NODES WITH HYPERALGESIA ABLATION WITH RESECTION OF INTERNAL JUGULAR VEIN

J S MALE aged forty one cabinet maker referred by Dr J Lynn Mahaffey of Camden New Jersey on April 29 1922 stated that for twelve year lumps have been appearing first low down in the left side of the neck becoming hard and sensitive and later extending upward along the left sternomastoid muscle gradually increasing in size He has had an attack of tonsillitis but his throat feels raw and smarts and there is a sensation as though there were constantly something to raise He has no nose or ear trouble There is no expectoration nor is there any loss of weight

Physical examination of the left side of the neck reveals along the carotid sheath a chain of hard nodes enlarged to the size of beans while low down above the clavicle there is a hard fixed node the size of a large grape These enlarged nodes are characterized by great sensitiveness both to the lightest touch of the fingers and to the pressure of the clothing No areas of softening are palpable in the nodes and there are no fistulae A skiagram of the chest was made and tuberculosis was reported although there are no active pulmonary signs of such a lesion at the present time The blood Wassermann reaction was negative There is a healed scar on the left side of the neck 2 inches long from a previous operation

This patient had been operated upon elsewhere about a year previously and while some of the enlarged nodes were removed a small cluster over the middle of the carotid sheath was left remaining being considered inoperable It was the hyper sensitiveness of this cluster that led the patient to seek further operative measures

Operation (May 16 1922) Ether—Sand bag beneath shoulders head turned to right L shaped incision along anterior border of sternomastoid muscle and then outward par





Surgical dissections in the neck are much simplified by free incision and free exposure. It is after the deep cervical fascia is freely divided and retracted that the deep structures of the neck so beautifully reveal themselves. To obtain free exposure and avoid blind dissection it may be necessary in some cases to divide the digastric omohyoid or even the sternomastoid muscle but provided these muscles are sectioned distal to their motor nerves and carefully sutured no harm is done and much annoyance and time are saved. In the goiter operation the infrahyoid muscles are divided with impunity and so are the recti in transverse abdominal incisions. That chief disturber of the surgeon's composure—the internal jugular vein—may be ligated and resected with the tumors without special danger and with relief from much anxiety. It was interesting to note the ballooning out of the common carotid artery after relieving the pressure and the effect of stimulation of the vagus. An excellent article on tuberculous cervical adenitis by that master surgeon John H. Jopson appeared in this publication last year (*Surgical Clinics of North America* Philadelphia Number February 1922 pp 187-197).

allel with clavicle and just above it. Flap of skin and fascia dissected upward and turned back on its posterior hinge. Sternomastoid muscle retracted exposing carotid sheath. Posterior belly of omohyoid divided to obtain a better exposure. Carotid sheath opened. A mass of nodes the size of a large grape was found adherent to the contents of the sheath and compressing them. When dissected from the common carotid artery the latter expanded to twice its original diameter. While dissecting the vagus nerve from the mass it was noted that the pulse beats slowed down 50 per cent. at once returning to their former rate when the nerve was free and no longer subjected to trauma. Coming now to the internal jugular vein it was found impossible to dissect the mass from this structure therefore the vein was ligated above and below the mass resected and removed with the latter. The large subclavicular mass was removed and on section found firm and gummy. After removing whatever smaller nodes remained the posterior belly of the omohyoid was sutured and the wound was closed rubber dam drainage being inserted beneath the superficial flap.

**Postoperative Notes (May 23d—seventh day after operation)**  
 —Stitches removed healing *per primam* throughout. After operation the voice had been reduced to a whisper but it is now returning. The patient can turn his head in all directions without any pain.

**August 2d—(two and one half months after operation)**  
 Patient states he has gained 18 pounds since the operation and that his voice is gradually regaining its former depth of tone.

**Comments**—The most striking feature of this case was the exquisite tenderness of the enlarged lymph nodes the lightest touch of the finger caused the patient to wince the weight of the clothes caused almost intolerable pain and at night rest upon the left side prevented sleep. In the absence of inflammation this tenderness is explained by the tenderness of the capsules and deep cervical fascia while the pain that radiated to the shoulder and that was relieved by removal of the tumors was due to pressure upon the third and fourth cervical nerves.

#### CASE IV UNUNITED FRACTURE OF RADIUS (LEFT) AUTOGENOUS BONE GRAFT INLAY DEFECTIVE OSTEOGENESIS FRACTURE OF GRAFT

W L MALE aged fifty one steamshovel engineer was referred by Dr W Horace Means surgeon to the Bethlehem Steel Company Lebanon Pennsylvania on July 6 1922 This patient received his injury on November 21 1921 while using an air compressor the hose suddenly became wrapped around his left forearm so extremely supinating the hand as to fracture the lower third of the radius and the styloid process of the ulna. The deformity was reduced immediately but after a few days it recurred and six days after the accident a Lane plate was applied Two months later the patient complained of pain at the site of fracture a skiagram revealed absorption of bone around the screw and the plate was therefore removed on January 21 1922 at which time there was firm union of the fragments There was now found partial ankylosis of the shoulder elbow and wrist joints which was treated by bakin and massage On or about May 15 1922 the patient noticed a prominence of the head of the ulna evidently due to absorption of the callus between the bone end permitting the radius fragments to override In February 1922 the patient was given oxyiodids owing to the presence of a 1+ positive Wassermann reaction

Physical examination of the left upper extremity reveals that the left hand rides up on the radius making the ulnar styloid process more prominent Palpation of the radius determines an angular deformity at the junction of the lower third with the upper two thirds the apex of the angle facing the ulna there is also preternatural mobility at this site Sensation along the dorsum of the thumb is impaired and since the injury the patient has had pain about the head of the ulna on motion (ununion fracture of styloid process) Skiagram



tibia a bone graft of suitable size and with periosteum attached was obtained in order to make a tight fit this graft was cut as much wider than the bone fragments removed from the radial slot as the combined width of the edges of the twin saw blades. One end of the inlay graft was beveled and driven down into the cancellous tissue of the lower end of the radius the other end was beveled and placed in the medullary canal above the slot

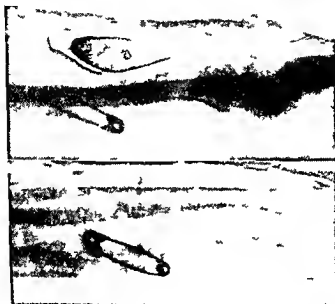


Fig 63—U t d f t f d ft rt fb g lt N t  
 bo mb pl d b tw f gm t t t p t f f t g  
 N t iso th t t d lna tyl dh be m d

while the intermediate portion rested in the slot and was secured by kangaroo tendon tied around the bone and over the inlay. The periosteum with overlying muscles and tendons still attached was sutured over the graft area after inserting bone crumb (separate foci of osteogenesis) between the periosteum and the graft and between the end of the radius fragments. The skin edges were approximated with a continuous

(Fig 62) reveal angular deformity absorption of callus and pseudarthrosis Wassermann reaction positive 1+

Operation (July 25 1922) Ether—Incision of 4½ inches along radial border of radius but not through previous operation scar Tissues retracted exposing radius the ends of the fragments were found displaced toward the ulna and slightly overlapping There were pseudarthrosis between the ends and



Fig 62—Union of fractured radius and ulna before operation. Note slight pseudarthrosis and sclerosis of proximal distal fragments.

atrophy of the little bit above the distal fragment a mass of callus was found The pseudarthrosis was excised the fragments were placed end to end and with the Albee motor saw (titanium blade) a slot about 3 inches long and ¼ inch wide was cut along the distal border of both fragments preparatory to the insertion of an animal bone graft The resulting lengths of bone were removed from the slot and put aside in saline solution to make bone crumbs out of it From the left

conical but the medullary canal for a distance of    inch from the end is obliterated and filled with sclerosed osseous tissue the latter however is an absolute contraindication to the use of metal plate which might hold the ends in alinement until doomsday without union resulting while in the case of the bone graft the medullary canal is opened up when preparing the gutter and the inlay graft *in situ* ordinarily conduct healthy and vi orous bone cell from the uninvolved portion of the medulla and endo teum to the site of fracture Likewise work in against us was fracture of the graft although this occurred remote from the operation at a time when internal fixation is usually no longer so vital and fractures of these grafts frequently heal therefore serving to stimulate rather than retard callus formation between the bone end themselves That the 1+ Wassermann reaction was an unfavorable factor cannot be gainsaid for lues in some manner does adversely influence the nutrition of bones although in this patient the tibial gutter from which the graft was obtained filled up with new bone in the usual average time of from four to six weeks The patient was given a course of antiluetic treatment before the bone graft operation was undertaken and under these conditions it was not thought inad visable to operate in the face of only a 1+ Wassermann reaction This entire subject of imperfect regeneration of bone offers a fertile field for investigation In this case if after a not too prolonged period of immobilization and constitutional treatment union does not result the question of reoperation with the insertion of a much longer inlay graft will be taken up

*Note* (February 15 1923) —A skiagram taken today after removal of the fixation splint reveal apparent union with excellent alinement of fragments



interlocking suture of No. 1 plain gut. No drainage was employed. A gauze dressing was applied and over it a copious layer of cotton was placed, the whole being encircled by a gypsum case extending from the base of the thumb up to the semiflexed elbow. A padded internal angular splint was then applied so as to fix the elbow joint. The forearm was suspended from the neck by a triangular sling. It should be stated that before applying the dressing, the fractured and ununited styloid process of the ulna was removed through an incision over the head of the ulna.

**Postoperative Notes** (September 16, 1922—seven weeks and four days after operation)—Gypsum case removed. The radius fragments and graft are apparently firmly united; the skiagram (F. 63) shows these structures in good position. Yucca board splints applied.

**December 11, 1922** (four and a half months after operation). Examination of left forearm shows distinct crepitus. Skiagram reveals fracture of graft and disturbed alignment of fragments. Double metal splints applied, immobilizing the wrist joint and calcium lactate and cod liver oil pushed. Pain at head of ulna which was due to the fractured and ununited styloid process has not been present since the latter was removed. Injections of neo-arsphenamin are being continued.

**Comments**—In the *Philadelphia number of the Surgical Clinics of North America* for February, 1922 (Vol. 2, No. 1, pp. 241-274) we presented 2 cases of ununited fracture of radius and ulna, in both of which the same operative procedure was employed with excellent result. Should the case herewith presented not ultimately result in union, it would fall into the category of 19.1 per cent failures with the inlay method of which McWilliam, from an analysis of all graftings reported in the literature, together with the results obtained from a questionnaire states that with the inlay method 80.9 per cent are successful. Working against us we had trophy of the end of the bone which is well shown in the skiagram (F. 62) where not only is the proximal end of the distal fragment

## CASE V NEUROMA OF MUSCULOSPIRAL NERVE ABOVE ELBOW NEUROLYSIS

M S MALE laborer aged fifty four was referred to us by Dr W H Means surgeon to the Bethlehem Steel Company Lebanon Pennsylvania on October 17 1922 On July 6 1922 the patient caught his right arm between a moving belt and a pulley crushing the arm contusing the shoulder and luxating the head of the radius Inspection soon after the accident revealed a brush burn of the arm and subcutaneous ecchymosis in the middle third of the arm while palpation detected forward luxation of the head of the radius It was evident that all tissues of the upper arm from the skin to the bone were more or less crushed as the patient could not flex the elbow sensation and motion were lost in the distribution of the median and musculospiral nerves to the forearm and hand and sensation was impaired in the digital distribution of the ulnar nerve Since the accident the median and ulnar nerves have recovered themselves

Physical examination of the right upper extremity reveals limitation of motion of the finger and wrist joints inability to extend the finger wrist to rotate the radius to flex the forearm or to move the shoulder joint without rotation of the scapula (ankylosis of shoulder joint) There is dystrophy of nails of thumb index and middle finger and there is also drop wrist There are no disturbances of sensation except in the distribution of the radial nerve where sensation is lost More complete and detailed neurologic tests were carried out by Dr Charles S Potts who agreed that there was compression of the musculospiral nerve above the elbow and that exploration of the nerve was justifiable

Operation (October 18 1922) —Ether Usual incision made for exposure of musculospiral nerve in the lower third of its course Working down in interval between brachioradialis laterally and biceps and brachialis medially the musculocutaneous



and forearm in that they are filling out markedly. The patient has as yet no voluntary control of extension of the fingers or the wrist or of flexion of the forearm.

Comments—This man was fortunate in that the entire upper extremity was not avulsed. The nature of the trauma was such as to exert a crushing force but traction as well as the result of the former the musculospiral nerve was caught between the vulnerating agent and the bone and severely injured while the traction resulted in a partial stretching of the brachial plexus especially involving the musculocutaneous nerve thus accounting for the patient's inability to flex the forearm through the action of either of the flexor muscles. The median and ulnar nerve underwent a mild degree of compression and recovered themselves within a reasonably short time. The musculospiral nerve was severely compressed not only by the initial trauma but by the subsequent formation of scar tissue. At the operation it was difficult to determine whether or not to resect the neuroma and perform end to end union of the nerve ends so we decided to rest content with the measures that were adopted reserving the more radical procedure until the postoperative recovery or non recovery of the nerve was evident.

A whole mass of literature has accumulated from experience with war wounds of nerves and some remarkable results of primary suture have been reported. Thus Wirth records a case in which a median nerve completely severed by a piece of glass was sutured at once. In two days there was distinct improvement in some of the movements controlled by the median nerve e. g. better flexion at wrist much better pronation less impairment of opposition and in abduction of thumb. There was however still inability to flex the terminal phalange of thumb and index. In six weeks almost complete return of normal muscle power was evident the grip however remaining somewhat weak. Sensation showed little improvement. Two months after injury trophic changes were noticed in the thumb index and middle fingers.

nerve was encountered and drawn aside and the musculospiral nerve was come upon surrounded by and embedded in scar tissue and the seat of a neuroma about 4 inches above the line of the elbow joint. The nerve was freed from the scar tissue surrounding it and multiple incision were made through the cicatricial covering of the neuroma and parallel with the long axis of the nerve. The neuroma and adjacent portions of the nerve were then buried in nearby muscle tissue and the wound was closed without drainage. Another incision was made more medially from shoulder to elbow over the biceps muscle and the belly and three tendons of the latter as well as the upper portion of the musculocutaneous nerve were examined to determine the cause of the patient's inability to flex the elbow but nothing amiss was found. The wound was closed. Manipulations of the finger, wrist and shoulder joints were now carried out until satisfactory passive motion was obtained. The wound were dressed, the wrist supported in extension by a cock up splint and a sling was applied to the forearm and band suspending the latter from the neck. Course of electric applications ordered.

Postoperative Notes (October 25 1922—seven days after operation)—Wounds exposed sutures removed heal *per primam* through out.

December 22 1922 (two months after operation) Letter from Dr Means. "With regard to S— I am sorry to say I can detect very little improvement. The drop-wrist is still present and the extensors of the wrist and fingers are more atrophied. The biceps refuses to function and the shoulder girdle shows atrophic changes. However the arrival of the electric apparatus which I believe so essential in this case has been delayed due to reason beyond my control. I feel that after I have used this apparatus on him for several months there will be a noticeable improvement."

January 16 1923 (three months after operation) Letter from Dr Means. "I have been using the electric apparatus for several weeks now and already there is noticeable improvement in the nutrition of the muscles of the shoulder and"

## EXHIBITION OF CASES CASE VI BONE BLOCK OF EXTENSION OF FOOT DUE TO FRACTURE OF ASTRAGALUS

H S MALE aged twenty five elevator constructor was referred to us on December 10 1922 by Dr A S Ross Chief of the New Jersey Rehabilitation Clinic Camden New Jersey for an estimate of the degree of disability On June 14 1922 a chain broke in the elevator shaft and the patient who weighs 222 pounds fell a distance of 47 feet landing mainly on his feet He was taken to a hospital where he remained about two weeks

Physical examination of the patient as he walks into the office shows that the right foot is held in a semi equinus position With shoe removed and both feet on a chair it is evident that the right foot is held in a greater degree of flexion than the left The patient is unable actively to extend the foot beyond this degree nor can the degree of extension be decreased by passive manipulations Motion in Chopart's joint is normal in extent The tendo achillis is taut The skiagram (Fig 64) reveals a vertical fracture of the astragalus just behind its middle with depression of the posterior fragment about  $\frac{1}{4}$  inch As the result of this depression the anterior fragment is left abutting against the anterior border of the inferior articular surface of the tibia thus explaining the semi equinus position of the foot and the inability of the patient to overcome it The skiagram of the left foot shows an oblique fracture of the posterior portion of the lower end of the tibia but with union in good position

Comments — This patient fell a distance of 47 feet landing with his 222 pounds on both feet on a concrete basement floor receiving in the right foot a fracture of the astragalus and in the left a fracture of the lower extremity of the tibia a difference that is doubtless due to the positions the feet were in when the patient landed upon them the right heel being nearer the ground



the arthrotomy—a measure that is so essential in rapidly restoring motion in these cases.

As to the amount of permanent and total disability a 40 per cent estimate was made based upon the present condition of the feet without treatment upon the patient's great weight and upon his ability to earn a livelihood by any vocation that he might be able to take up. With operative and other measures this disability could probably be reduced to less than 25 per cent. He was awarded 45 per cent.



than the left. The common result of such a fall is an impacted fracture of the os calcis.

As to the treatment the obvious procedure is arthrotomy of the ankle joint, shaving down the upper surface of the anterior fragment to the level of that of the posterior fragment of the astragalus, thus relieving the bone block and permitting ex-



Fig. 64.—Fracture of the astragalus, with displacement of the bone block into the foot.

tension of the foot upon the leg. The whole astragalus could be removed, with the promise of excellent function resulting. Should the operation be unduly postponed it may not be possible—even though the bone block be removed—to extend the foot without performing an adduction Z-plasty division of the tendo achillis. Such a tenotomy, however, would delay the early institution of active and passive motion after

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As to the amount of permanent and total disability a 40 per cent estimate was made based upon the present condition of the feet without treatment upon the patient's great weight and upon his ability to earn a livelihood by any vocation that he might be able to take up. With operative and other measures this disability could probably be reduced to less than 25 per cent. He was awarded 45 per cent.



## CASE VII. MULTIPLE CHONDROMATA OF HAND SARCOMATOUS DEGENERATION (?) OF ONE CHONDROMA

G H MALE aged seventeen years was referred to us for consultation on January 8 1923 by Dr W Horace Means of Lebanon Pennsylvania The patient complained of swellings of the middle and fifth metacarpal bones of the right hand which have been present since infancy The swelling of the fifth metacarpal bone has increased rapidly in size of late The skiagram (Fig. 65) at once shows the conditions present. Ir

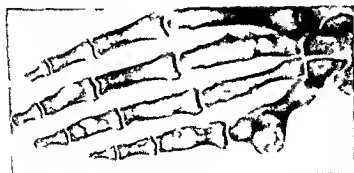


Fig. 65.—Multiple chondromata of the hand. The tumor involving the fifth metacarpal particularly malignant.

regular shadows are seen in some of the phalanges and cortico-medullary changes in some of the metacarpals. It is the fifth metacarpal however which because of its rapid increase in size of late has brought the patient to the surgeon for relief.

Comments.—Chondromata are frequently situated in the metacarpal bones and phalanges of the hand where they are usually multiple and arise from the medulla. They are very likely congenital in origin.

What to do in the case before us is fairly obvious. The

largest and most troublesome tumor is that involving the fifth metacarpal bone. Of the five metacarpals in the hand the fifth situated as it is at the ulnar border is the one most exposed to trauma. The patient states that the swelling of the fifth metacarpal has rapidly increased in size of late. That means that it has no doubt been traumatized and at once suggests malignant transformation into chondro-osteosarcoma. Such a case involving the index finger was reported in this publication by G. P. Muller.<sup>1</sup> It is therefore urgently incumbent upon us to advise disarticulation of the fifth digit at the carpometacarpal joint. The patient would be much safer without this very suspicious tumor and when using the hand would hardly miss the little finger. After removal of this digit its neoplasms could be examined histologically—that of the metacarpal to determine the presence of malignant transformation and that of the proximal phalanx to fix the character of the neoplasms of the other digits. We do not consider it wise in these cases to remove a portion of the tumor for microscopic examination for fear of stirring up metastases. In this case in particular the tumor of the fifth metacarpal has reacted to recent trauma by rapidly increasing in size and the added trauma involved in moving a specimen may release a horde of malignant cells to run amuck in the body. The skiagram too shows that the cortical shell of this tumor is almost broken through at one spot. The tumor involving the third metacarpal does not look active nor is it exposed to trauma like that of the fifth. As for these remaining neoplasms a watchful waiting policy should be adopted as it is not unlikely that their growth will be checked and even that they will undergo involution with the cessation of the metabolic activity of the cartilages further along in this young man's adolescence.

## CLINIC OF DR ARTHUR E BILLINGS

### PENNSYLVANIA HOSPITAL

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#### CASE I. PERFORATED DUODENAL ULCER

THE first case we are operating upon this morning is that of a woman fifty two years of age. She is married and was admitted with the diagnosis of gall bladder disease and presents the following history.

Patient states that she was relatively well until December 5th when she was seized with sudden severe pain in the epigastrium and right hypochondrium radiating occasionally to the right shoulder. She states that she has been slightly jaundiced on several occasions but never markedly so at any time. She eructates much gas has frequent attacks of heartburn with indigestion and is chronically constipated. She does not associate pain directly with the taking of food has vomited three or four times each day since the onset of her acute trouble and complains of anorexia vertigo and dyspnea on exertion. She states that she has had many attacks similar to this one since 1916 but never so severe in character. Prior to that date she had suffered from flatulent dyspepsia and right upper abdominal pain at irregular and long intervals. She has been married for thirty years has had 8 children 4 of whom are living and well 1 died of meningitis. There is no history of miscarriages or abortions. Menstruation began at seventeen years of age was always regular and normal in character until her menopause eight years ago. No history of tuberculosis or malignancy in family.

She has been in the hospital for five days and was slightly febrile until yesterday her temperature ranging between 100 F and normal. Blood examination Hemoglobin 95 per cent red blood cell 4 870 000 leukocytes yesterday were 11 200

Urine negative except for a trace of albumin and many pus-cells on first examination but three subsequent examinations were negative. There is no evidence of bile in the urine nor has she ever had any urinary symptoms and she has not been jaundiced since admission to the hospital. There is nothing worthy of note in her physical examination other than that of the abdomen and heart. She presents the characteristic signs of a fairly well compensated aortic regurgitation. She has a *Corn an* pulse with a slight presystolic thrill at the apex. The second sound at the aortic area is soft, short and blowing in quality. The second pulmonic and second apical sounds are doubled. The abdomen is tender and moderately rigid over the whole of the upper quadrant. There is an easily palpable mass in the region of the gall bladder. We have not subjected her to a gastro-intestinal x-ray study because of the acuteness of her symptoms. We do not feel certain as to the diagnosis in this case. Her symptoms will fit pretty well into the clinical picture of a chronic gall bladder disease complicated by an acute hydrops or empyema of that viscus. I think we can eliminate the possibility of acute renal or perirenal infection. The presence of a duodenal or pyloric ulcer with a low leak is a strong probability in the differential diagnosis and I feel cannot be excluded without x-ray study but her history is more suggestive of cholecystitis. There is no history of a previous typhoid or influenzal infection which we always regard as an important factor in the etiology of gall bladder disease.

In view of the patient's cardiac condition ether is certainly the anesthetic of choice and preliminary to her anesthesia she was given  $\frac{1}{2}$  gr. of morphine sulphate and  $\frac{1}{150}$  gr. of atropine hypodermically.

We give routinely to adults the hypodermic of morphine and atropine half an hour before anesthesia no matter what the anesthetic is to be. We are convinced that it induces a more receptive mental attitude on the part of the patient than it lessens the amount of anesthetic necessary, that it gives a more even and agreeable anesthesia and reaction is less unpleasant and more placid.

The field of operation has been prepared with tincture of iodine (pharmacoepal strength) and then washed with 95 per cent. alcohol. This patient is a short square chested individual with a wide intercostal angle and a thick abdominal wall. We will open the abdomen through the transverse incision as described by Moschowitz which I think in this type of case gives a better exposure than vertical incision. It is certainly more easily closed and I do not believe there is any more danger of hernia after its use if a careful and accurate anatomic apposition is obtained in its closure. The diagnosis is a walled off perforated duodenal ulcer rather than an acute infection of the gall bladder. There is a large indurated ulcer just beyond the pylorus in which there has been a small perforation surrounded with considerable plastic exudate and no generalized extravasation of contents. There is no evidence of gall stones or gall bladder or duct involvement other than that of a pericystic inflammation which would be readily accounted for in such a closely related process. We will invert the ulcer with a series of broad imbricating mattress-sutures of linen thread which will obstruct fairly completely for a time the food carried over the ulcerated area and will help to divert it through the new opening in the stomach made by doing a no-loop posterior gastrojejunostomy and we believe that it is an essential step in the successful treatment of these lesions. We make this a part of the routine procedure except in the late cases where the patient's condition is *in extremis*. In these cases where peritonitis is diffuse haste is imperative and nothing more than closure of the perforation with drainage should be attempted. Where there has been much extravasation of duodenal or gastric contents and peritonitis is marked drainage should be gained through a suprapubic stab wound with a rubber covered gauze drain or a soft rubber tube leading into the pelvic pouch with or without a rubber covered gauze drain through the operative incision. If this is indicated care must be observed in placing the drain away from the closed perforation for fear of inviting subsequent leakage. In this case drainage is not indicated. Our anastomosis is completed and you will observe that by the no-loop operation we



Urine negative except for a trace of albumin and many pus-cells on first examination but three subsequent examinations were negative. There is no evidence of bile in the urine nor has she ever had any urinary symptoms and she has not been jaundiced since admission to the hospital. There is nothing worthy of note in her physical examination other than that of the abdomen and heart. She presents the characteristic signs of a fairly well compensated aortic regurgitation. She has a Corrigan pulse with a slight presystolic thrill at the apex. The second sound at the aortic area is soft, short and blowing in quality. The second pulmonic and second apical sounds are doubled. The abdomen is tender and moderately rigid over the whole of the upper quadrant. There is an easily palpable mass in the region of the gall bladder. We have not subjected her to a gastro-intestinal x-ray study because of the acuteness of her symptoms. We do not feel certain as to the diagnosis in this case. Her symptoms will fit pretty well into the clinical picture of a chronic gall bladder disease complicated by an acute cholecystitis or empyema of that viscus. I think we can eliminate the possibility of acute renal or perirenal infection. The presence of a duodenal or pyloric ulcer with a slow leak is a strong probability in the differential diagnosis and I feel cannot be excluded without x-ray study but her history is more suggestive of cholecystitis. There is no history of a previous typhoid or influenzal infection which we always regard as an important factor in the etiology of gall bladder disease.

In view of the patient's cardiac condition ether is certainly the anesthetic of choice and preliminary to her anesthesia she was given  $\frac{1}{2}$  gr of morphin sulphate and  $\frac{1}{150}$  gr of atropin hypodermically.

We give routinely to adults the hypodermic of morphin and atropin half an hour before anesthesia no matter what the anesthetic is to be. We are convinced that it induces a more receptive mental attitude on the part of the patient that it lessens the amount of anesthetic necessary that it gives a more even and agreeable anesthesia and that it is less unpleasant and more placid.

treatment of these cases. Many of them who have had a skillfully performed operation have continued trouble or if relieved of symptoms for a time have them recur later because both surgeon and patient have been neglectful in carrying out the proper dietetic and hygienic regime necessary to complete recovery. A long convalescence in this respect is necessary and these patients as soon as they begin to feel comparatively well after operation (which they soon will) then become careless and commit dietetic indiscretions with the usual unhappy result and in many cases all because they have not been instructed how to intelligently care for themselves or have not been sufficiently impressed with the importance of it. The operation is only a part of the treatment and after the patient has recovered from it he is better for being in the care of an experienced gastroenterologist for the after management.

mean that the jejunum is caught as closely to the ligament of Treitz as is possible without causing tension at the site of anastomosis which is isoperistaltic. Strictly speaking there are perhaps 2 or 3 inches of jejunum proximal to the stoma. The opening in the gastrocolic omentum has been sutured with interrupted sutures of catgut to the gastric wall inch away from the line of anastomosis. This precludes the possibility of hernia into the lesser peritoneal cavity. The after treatment of this patient will consist in placing her in the Fowler position and giving continuous enteroclysis of 5 per cent solution of glucose and 2 per cent bicarbonate of soda. Small quantities of water by mouth will be given at the end of twenty four hours if nausea has ceased and after forty eight hours plain albumin water (without orange or other fruit juice) and on the fourth to the seventh day peptonized milk, junket, custard and soft eggs with a full soft diet from the tenth to the fourteenth day. During the first forty-eight hours after operation morphine will be given in sufficient dosage to relieve her of pain and to induce a fair amount of sleep. If there are no symptoms to indicate an earlier inspection her wound will be dressed on the ninth or tenth day when the stitches will be removed. Hot water should be given freely when the patient has begun to take soft and solid food a glass half an hour before and on or two hours after feedings is distinctly advantageous in preventing regurgitation and discomfort and encourages a more prompt emptying of the stomach. The upright position after meals also facilitates this just as does the Fowler position immediately after operation. The hyperacid tendency on the part of these patients is first met with an easily digested high protein diet given at frequent feedings and if this is not sufficient alkalis are added. A strict diet must be adhered to for at least five months at least. Most of these patients are constipated and it is very important to overcome or avoid this condition as it is frequently responsible for regurgitation and distress during the convalescence before they have had a chance to become adjusted to the new physiology of their digestive mechanism.

We are apt to pay too little attention to the postoperative

## CASE II ACUTE CHOLECYSTITIS—CHOLELITHIASIS

THE second case is that of a married woman thirty five years of age whose chief complaint on admission was pain in the right upper abdomen. She does not remember having had any serious illness and has never had an operation. Since 1919 she has had attacks of indigestion manifested by discomfort in the epigastrium (not real pain) constipation headache gaseous sour and bitter eructations usually accompanied by nausea and vomiting with relief. These attacks have occurred about two or three months apart. Her present illness began two weeks ago with acute intermittent pain over the whole of the upper abdomen with much gaseous eructation. She was constipated and took a saline cathartic and felt better on the following day resuming her work. Twenty four hours later she was seized with more severe pain which was colicky in character. At this time she was much nauseated and vomited several times. The pain became localized to the right upper quadrant. She did not notice any jaundice prior to her admission to the hospital. There is nothing of significance in her social or family history. On admission to the hospital her temperature was 100 F pulse 100 and respirations 26. She was slightly but definitely jaundiced. Urine was negative except for a trace of bile. Blood Hemoglobin 80 per cent red blood cells 3 750 000 leukocytes 12 800 coagulation time three minutes. There were no abnormal findings in her physical examination except in the abdomen which was distinctly tender and rigid over the whole of the right upper quadrant with a rounded smooth mass which moved with respirations and was easily palpable. We felt that this mass was an acutely inflamed distended gall bladder and if she were kept quietly in bed with heat or ice over the abdomen with enough morphin hypodermically to relieve her of pain continuous enteroclysis and little or no fluid by mouth the attack would subside.



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With the liver above the transverse colon below the peritoneum in front and the omentum ever ready for protective mobilization the anatomic position of the gall bladder is such as to almost always insure a localization of any inflammatory process of which it may be a victim. Occasionally rupture of the gall bladder ensues where suppuration has occurred but in this event no general contamination of the peritoneum takes place and a walled-off abscess is the usual result. Rarely a fistula into the duodenum or transverse colon is formed with discharge of its contents into the intestinal tract. An abatement of the acute symptoms may then generally be expected and our remedial measures before operation are directed toward this accomplishment. Her temperature remained about 100° F. for the first twenty-four hours after admission then became higher ranging between 102° and 103° F. for thirty-six hours but gradually getting to normal on the fifth day after admission. During this period her tenderness became more acute and her jaundice more marked but her coagulation time had not increased. Her temperature has been normal for the past thirty-six hours and the leukocyte count is 12,600 practically the same as on admission. Her history and symptoms are quite characteristic of gall bladder disease. She has had a gradually increasing flatulent dyspepsia without any real grouping of symptoms manifested chiefly by weight or oppression in the epigastrium with gaseous acid and sometimes bitter ructation. Nausea and vomiting at the height of her discomfort have been conspicuous symptoms and have always given relief. Until the onset of this acute attack she had not complained of pain notwithstanding a distressing dyspepsia of three years' duration. This is the typical course of progression in the development of chronic gall bladder disease. Then suddenly the development of an acute cholecystitis or the passage or lodgment of a stone in the ducts these patients are seized with a sudden violent right upper abdominal pain unlike any they have ever had before. It usually radiates to the back or right shoulder sometimes to the left and requires morphin hypodermically for its relief. It is colicky in character and lasts for a variable length

of time ordinarily from a few minutes to several hours. The temperature is apt to become elevated but during the intensity of the attack the patient may actually be in a state of shock. The pain of gall bladder disease is usually a late symptom and means the presence of stone or an acute exacerbation on a chronic inflammation. In duodenal ulcer pain is an early and the most prominent symptom and in 8 out of every 10 cases we find that there is a definite time relationship between the taking of food and the onset of pain. There is also a distinct periodicity as to the occurrence of the symptoms in ulcer. The symptomatology of gall bladder disease is without order and in its earlier phases is as insidious as it is inconsequent flatulency being its most constant manifestation. This patient has a rather oblique costal margin with a narrow intercostal angle and we will open the abdomen through a vertical right rectus incision. On inspection we find that the gall bladder is obscured from view by adherent omentum and transverse colon which is the result of a recent inflammation. We will protect the rest of the peritoneum and viscera by thoroughly walling off with gauze packs. There is no evidence of gastric or duodenal ulcer. The adhesions are quite easily separated the gall bladder is enlarged tense and inflamed and contains many stones. There is a stone in the common duct at its juncture with the cystic duct. The pancreas is about normal in size and does not seem abnormally hard. The question now arises as to whether we shall do a cholecystectomy or a cholecystostomy. In view of the rather severe infection obstruction of the common duct a fairly deep jaundice and cholangitis to a greater or lesser degree removal of the stones with drainage of the gall bladder would seem to be the advisable procedure. The gall bladder is grasped with two Allis forceps and the fluid is aspirated with a trocar to prevent soiling when it is opened. We will culture the bile which is very thick dark and purulent a section of the gall bladder wall will also be taken for pathologic and bacteriologic study. In many of these cases organisms are recovered from the mucous membrane or tissue of the gall bladder when cultures from the bile and stones are negative. Streptococci staphylo-



cocci colon bacilli and typhoid bacilli are the organisms usually found and in many instances are the nidus upon which stone formation begins. After removal of the other stones the one in the common duct was removed through the cystic duct which is considerably dilated by the large stone impacted in it. Drainage will be obtained through a rather large rubber tube anchored within the gall bladder with chromic gut No. 1 after we have secured a water tight inversion of the cut edges of the gall bladder around the tube. Irrigation of the gall bladder is then done with normal salt solution for the purpose of removing the blood-clot and debris proving the patency of the tube and the tightness of the closure around the tube. A small rubber covered gauze drain is also placed alongside the tube into the gall bladder fossa. The wound will be closed in layers around the tube and rubber drain both being fixed in position with skin sutures. The after treatment will consist in giving enough morphine to relieve her of pain and enteroclysis continuously until she can take a sufficient quantity of fluid by mouth. The rubber-covered drain will be removed on the third day and the tube will be kept in place for at least two weeks and possibly longer depending upon how quickly her bile becomes normal in character. If bleeding or persistent oozing should occur we will give her an intravenous infusion of 0.2 per cent. calcium lactate solution or 15 c.c. of horse serum subcutaneously.

### CASE III. ACUTE OSTEOMYELITIS

THE next 3 patients that I wish to show you are cases of acute osteomyelitis all having been operated upon. I am presenting them because each of them has manifested a different type of infection and each of them has had complications which have added to their surgical interest all representing different phases in a disease which is full of interesting and distressing clinical and pathologic possibilities.

The first of these cases of osteomyelitis is a boy eight years of age who was admitted to the hospital on June 17 1921. His chief complaint on admission was pain in the left leg.

**Family History**—Mother died of appendicitis at thirty years of age. Father is living and well. Three sisters and one brother are living and well. Three sisters are dead one of whooping cough the cause is unknown for the death of the other two. No history of malignancy or tuberculosis in family.

**Past Medical History**—He had pneumonia with influenza in 1918. On March 29 1921 he was admitted to this hospital for tonsillectomy with the diagnosis of hypertrophied tonsils and adenoids. Previous to that date he had had several attacks of tonsillitis and had complained of pain in the right knee. His general physical examination preparatory to tonsillectomy did not reveal anything abnormal except for what he was admitted. His tonsils and adenoids were removed on March 29 1921 and he was allowed to go home on March 30 1921—discharged in good condition. On the following day after his discharge from the hospital he developed pain in the left knee and could not walk. The next day the right knee became painful and on April 2d both knees became swollen and more painful and he was admitted to this hospital again April 6 1921 with both knees painful tender warm slightly reddened swollen and slightly fluctuating. Physical examination otherwise was negative except for slight tenderness over right lower quadrant.

of abdomen and sore throat. There was no evidence of other involvement. His temperature at this time was 107° F, pulse 116. There were 13,100 leukocytes. The left knee joint was aspirated at the time of admission; fluid was obtained but no organisms were found on smear or culture. The temperature went up to 103.4° F on the next day but on the fifth day after admission his temperature had become normal and remained so during the remainder of his stay in the hospital. The swelling of the joints rapidly disappeared and he was discharged as well on April 20, 1921, with the diagnosis of *acute rheumatic fever*. His urine showed a few white blood cells on admission and discharge but was otherwise negative. He remained well after he left the hospital until June 15, 1921, when he developed severe pain in the left leg. This became worse and he could not walk. He vomited before the onset of pain but attributed this to overeating. On admission to the hospital June 1, 1921, he did not complain of any symptoms referable to the gastrointestinal or genito-urinary tracts, the circulatory, respiratory or nervous system. His temperature was 104° F, pulse 136, respiration 28. The left leg was markedly swollen, reddened, painful and tender; no evidence of effusion in the knee joint; no other joints involved and extremities otherwise normal. There is no evidence of fracture or injury and physical examination is otherwise negative.

*Urinalysis*.—Amber acid 1028; cloud of albumin, urinary negative. Microscopic: Casts (2 hyaline), red blood cells 0, white blood cells 2 per field, few urates, few phosphates.

*Blood Examination*.—Leukocytes 28,800; differential count: polys 81 per cent, small lymphocytes 9, large lymphocytes 3, transitionals 1, eosinophils 0, basophils 0.

The diagnosis of *acute osteomyelitis* of the left tibia was made and soon after admission and under nitrous oxide anesthesia he was operated upon by Dr. Edward Klipp. After the field had been prepared with tincture of iodine and alcohol and incision internal to anterior border of tibia was made liberating a marked accumulation of pus from beneath the skin and periosteum, the latter having been detached for some distance below

the upper epiphysis. The medullary cavity was then opened through a channel made in the shaft with a chisel. Pus was found in the medullary cavity. There did not seem to be any marked destruction of the epiphysis. A number of Carrel tubes were placed in the medullary cavity for subsequent irrigation with Dakin's solution. Reaction after operation was satisfactory. Culture obtained from pus at operation showed pure culture of *Staphylococcus aureus*. His temperature for the first few days after operation ranged between 100 to 103° F until the fourth day after when it settled down to 101 to 102° F. This continued until July 13th when we operated upon him under nitrous oxide anesthesia for involvement of the lower end of the left femur through an incision above the inner condyle from which pus was obtained. The incision over the tibia was then extended and a large sequestrum which included the entire length of the shaft between upper and lower epiphysis was enucleated (Figs 66-68). The upper epiphysis looked to have been entirely destroyed with a considerable portion of the articular surface of the tibia leaving the knee joint open on its inferior surface. Carrel tubes were placed in the cavity for sterilization with Dakin's solution which was followed with the usual technique. His temperature then gradually got lower but persisted between 99 to 100° F. We were unable to obtain a growth on blood culture. There was considerable swelling of the left knee joint. On August 3d an exploring needle was introduced into the joint cavity under gas anesthesia but no fluid was obtained. It was assumed that the joint swelling was due to arthritis without suppuration. He continued to progress fairly satisfactorily, temperature gradually getting a little lower, remaining below 100° F most of the time. During this period his urine on repeated examination was negative except on two occasions when a few pus cells (2 or 3 to a field) were reported. He also had during the height of his febrile period a few hyaline casts reported on one occasion. He had not complained of any urinary symptoms up to this time. On October 11th which was one hundred and nineteen days after his admission he complained of sudden severe pain in the left upper abdomen and back.

He had a sharp rise in temperature (103 F) with marked tenderness over the left kidney in front and behind with considerable muscular rigidity. His temperature persisted around 103 to 104 F for five days gradually getting down to



Fig 66—Case III Showing involvement of left kidney in pyelitis.



Fig 67—Case III Showing involvement of right kidney in pyelitis.

about 100 F again. During this period he developed frequency of urination with pain referred to the genitalia on micturition. Blood-culture was again negative. We were uncertain as to

whether he was suffering from acute pyelitis or had an infarct with a beginning pyonephrosis. As his temperature subsided his pain and tenderness decreased. Two weeks after the onset



Fig 68—Ca III St w g cal l l w d f both t d l ft  
calca kid y

of this complication all pain had disappeared and there was very little or no tenderness and the kidney was not palpable. The urine however was loaded with pus. He has had a mild pyuria

ever since which has lessened very much during the past six weeks. On x-ray examination of his genito-urinary tract we found a very interesting condition (Fig. 68). The region of the left kidney is the seat of shadows which would ordinarily be interpreted as a calcareous or tuberculous kidney. In addition to this his first plates showed some very interesting shadows about the lower end of each ureter. Dr. Bowen to whom we are much indebted for the careful x-ray studies of this patient did not feel certain as to the nature of these shadows. At first there were three conditions to be considered in their interpretation: the shadow in the region of the left kidney might ordinarily be interpreted as tuberculous in which condition it would be easy to assume that the pelvic shadows were calcified tubercular glands. Phlebocleroma was another consideration and of course stones in both ureters was the other. The left side showed four shadows and the right side three. On both sides they seemed to be superimposed one upon the other. We then felt that a cystoscopic examination with ureteral catheterization should be done. The boy is only eleven years of age and it was difficult to get a cystoscope into the bladder and we are indebted to Dr. Leon Herman for a very skillful and satisfactory ureteral and bladder study. On catheterization of the left ureter with a No. 15 French single catheterizing scope he was unable to obtain any urine. The patient was then given an intravenous injection of indigocarmin which did not appear from the left ureter after twenty-five minutes observation. He did not encounter any obstruction in the left ureter and after irrigation through the catheter only enough fluid from lavage was obtained for culture. On the right side there seemed to be definite obstruction just above the ureteral opening but the catheter was passed after difficulty and there was a slight delay in function; the indigocarmin appeared six minutes after injection. The function for the first hour was 70 per cent and for the second hour 15 per cent, giving a total function of 85 per cent for the two hours. A pure culture of staphylococcus was obtained from the right with no growth reported on culture from the left. The day following the ureteral catheterization he was

seized with severe colicky pain attended with nausea vomiting urinary difficulty and the passage of a stone. You will observe in the x-ray plates the changed relationship in the shadows all shadows on the right side having disappeared while those on the left side are unchanged in position (Fig. 69). In addition to this complication he has had an insidious infection in the neck



Fig. 69—Chest X-ray showing the relationship of the shadows on the right side having disappeared while those on the left side are unchanged in position (Fig. 69). In addition to this complication he has had an insidious infection in the neck

of his right femur of which he has never complained and which he has never ceased to use. He has depended on the right leg to the full exclusion of the left in changing his position in bed. You will observe that although his movements are somewhat restricted there is no marked limitation in any direction. He does not complain of pain on movement and will not admit



that he has ever had pain in the right hip during his stay in the hospital. You will see that he has some deformity with elevation of the great trochanter. This is confirmed by x ray which shows almost a total destruction of the head and neck with a pathologic fracture resulting in a pseudo-arthritis. We did not recognize this condition until the damage had been done.



Fig. 9—Case III. Shows generalized tuberculosis of both tibiae and femora.

I feel confident that it is a part of the same infection that he is suffering elsewhere and that he has had a generalized blood infection notwithstanding the fact that repeated blood cultures have always been negative. The wounds of the left leg have been entirely healed for several weeks and you will see from the ray and appearance of his leg that he has had a rapid and abundant

regeneration of new bone (Figs 70 71) The removal of the very large sequestrum enabled us to sterilize the cavity of the involucrum more quickly than we could have otherwise Caution must be observed lest it be done too soon I mean by this before it has acquired sufficient rigidity to maintain the contour

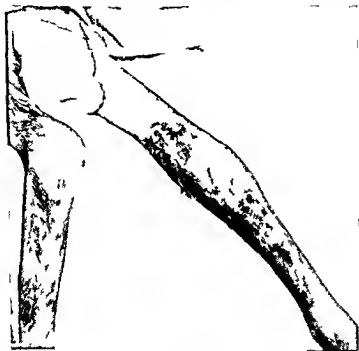


Fig 71—Ca III H 1 d w d

of the extremity This is most important in the growing child where there is involvement of femur or humerus If epiphyseal invasion has occurred a disproportion in the growth of the tibia and fibula or the ulna and radius is apt to take place resulting in contracting and unsightly deformities which are very difficult and sometimes impossible to correct



#### CASE IV ACUTE OSTEOMYELITIS OF RIGHT FEMUR SUPPURATIVE ARTHRITIS OF RIGHT KNEE JOINT

THE fourth case is that of a man thirty eight years of age whose family and previous medical history are negative so far as having any bearing on his present illness is concerned. He says that he has never been sick, denies usual disease incidental to childhood, has never had any operations, no history of trauma. During September and the early part of October 1921 he was confined to bed for four weeks with influenza. On the third day after he had gotten out of bed he felt pain in the right leg and thigh. This troubled him slightly for two or three days and then he had a chill with a profuse sweat and increased pain in the leg. He was admitted to the hospital on October 10th with temperature 101° F, pulse 100 and respirations 38. General physical examination on admission was negative except for tenderness and slight muscular rigidity over the region of the gall bladder. There was also slight tenderness over the upper third of the right femur on very deep pressure. There was no restriction of movement in any direction and no pain on motion. Urine was negative, blood hemoglobin 60 per cent, red blood cell 4,150,000, leukocytes 21,000. Widal reaction was negative for typhoid and paratyphoid. Blood culture was negative. Wassermann was negative. Sputum negative for tubercle bacilli. X-ray examination was negative on admission. The patient for the first five days after admission was observed by Dr. McCracken on the Medical Service. He was then transferred to the Surgical Service of Dr. Gibbon to whom I am indebted for the privilege of operating upon and studying these cases. We then observed him for five days more before operating. In the meantime he had developed more tenderness over the region of the gall bladder with definite jaundice and with considerable bile in the urine. During the greater part of this time he did not complain of much pain in his thigh. He had

slight tenderness on deep pressure over the upper half of the femur. The leukocyte count was fluctuating around 30 000. His differential count showed 66 per cent. polys. 30 per cent. lymphocytes 2 per cent. large mononuclears 2 per cent. transitionals basophils 0 eosinophils 0. The stools at this time were clay colored and on two attempts at drainage of the bile-ducts through a duodenal tube with the installation of magnesium sulphate into the duodenum we were unable to recover bile or organisms from culture. During his stay on the Medical Service his temperature was pretty steady around 102 to 103 F. His pulse rate during this time was never above 104 and usually 84 to 96. On October 16th his temperature dropped to 99 F and it did not go above 100 F for three days. On October 20th however it went up to 102.3 F with an increase in his leukocytosis to 41 600. By this time his jaundice had cleared up and there was only very slight tenderness over the gall bladder. A second blood culture was negative and on x-ray examination again there was doubt as to whether or not there was a lesion in the femur. On October 21st we operated under nitrous oxide oxygen and ether anesthesia which had been preceded with  $\frac{1}{2}$  gr morphin and 1/150 gr atropin hypodermically half an hour before. The field of operation was prepared with tincture of iodine and alcohol. The entire shaft of the right femur between the great trochanter and condyles was exposed through an incision along the outer surface of the thigh. The periosteum was found thickened but no pus was encountered until the medullary cavity was opened. A trough or gutter was made opening the medullary cavity for its entire length between the great trochanter and base of the condyles. The medullary cavity was everywhere filled with pus and was under considerable pressure but had not broken through the cortex. Carrel tubes were so placed and fixed within the medullary cavity that its entire surface would be freely irrigated with Dakin's solution. The organism obtained from culture and smear from pus showed a pure culture of the *Bacillus mucosus capsulatus*. We repeatedly obtained this same organism in pure culture from the wound on subsequent examinations.

The patient was not severely shocked by the operation and his temperature persisted around 102 F for the next week. On the fifth day after operation the right knee became very much swollen and painful with signs of effusion in the joint. This increased and on the seventh day after operation the joint was aspirated more than 4 ounces of thick creamy pus was withdrawn extension was applied and ice was kept continuously over the joint swelling subsided and effusion did not recur. A culture and smear from this also showed a pure culture of the *Bacillus mucosus capsulatus*. His temperature within forty eight hours after the joint aspiration had dropped to 100 F and within two weeks after operation was running 99 to 100 F

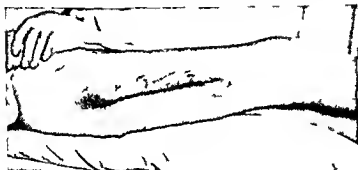


Fig 72—Ca IV Healed wound

and within five weeks was entirely normal and has remained so since. On December 7th we were able to get his cavity sterilized having obtained three successive negative smears and cultures when we removed the Carrel tubes allowing the wound to close. This wound surface and the surrounding skin was then kept clean by the application of tincture of iodine and his wound as you will observe has entirely healed over (Fig 72). His x ray plates show good regeneration of bone and there has not been any sequestrum formation (Fig 73). x Ray plates of the knee joint have not shown any evidence of gross bone or cartilaginous involvement. He has marked restriction of movement in the knee joint as you will see but he is steadily overcoming this



F 73—Case IV Sh g bo eg d mal k ee j t th  
t bo h ges three m th f pe t

and I feel that he should ultimately get a complete or nearly complete return of function with the aid of massage movements etc.

## CASE V RECURRING SUPPURATIVE OSTEOMYELITIS (MULTIPLE)

THE fifth case is that of a boy nineteen years of age. He has been an exceedingly interesting case and we have been watching him since June 7 1917. Dr. Despard and I have each operated on him several times at the Jefferson Hospital. I shall only give you a very brief abstract of his history and progress during his several admissions to the hospital.

There is nothing in his previous personal or family history that relates to his present condition. A few days before the onset of his osteomyelitis he had an abscess in the left side of his neck which was opened in the Outpatient Surgical Department of the Jefferson Hospital. He did not give a history of any antecedent injury. He has had a succession of lesions beginning with an extensive osteomyelitis of the left humerus which ultimately involved the entire shaft and which was widely opened the shaft being guttered from the greater tuberosity to the condyles below. He was very ill with this infection. A pure culture of *Staphylococcus pyogenes aureus* was recovered from both the medullary cavity of the humerus and the blood stream. He recuperated fairly rapidly and was discharged from the hospital August 27 1914 to the Outpatient Department. He was then readmitted a few months later with an osteomyelitis of the right clavicle for which he was operated upon. His third admission and third operation was for an involvement of the left tibia. The next bone to be involved was the shaft of the right humerus. The involvement was not quite as extensive as that of the left arm. He then developed an abscess over the right gluteal region for which a necrosis of the right ilium was responsible. The next point of involvement was that of the left sacro-iliac joint which was opened and drained. He then had an osteomyelitis of two ribs in the right chest with subsequent pleural infection and empyema (Fig. 74). We



have always recovered a *Staphylococcus pyogenes aureus* from his various lesions. We have also recovered the organism from



the blood on two occasions more than a year apart. He has always shown a fairly rapid bone regeneration. He has always

manifested a great deal of difficulty in establishing a complete immunity against this organism but in spite of the many recurring and severe exacerbations of this infection he has grown and developed about as rapidly as one would have expected had he been in good health for this period of four years. We think he is about well at this time but we have been misled as to his condition on more than one occasion in the past and we will continue to keep him under observation until we are certain that recovery is complete. You will observe that he has a completely ankylosed left elbow. He had a recurring infection in the left humerus in the latter part of 1919 and the early part of 1920. At this time the lesion extended into the elbow joint resulting in a very destructive arthritis with a subsequent involvement of the left ulna. This patient is interesting because of the marked chronicity of infection and multiple foci of involvement. The staphylococcus in this case has shown a marked affinity for osseous tissue. During the long period of infection with many acute and severe exacerbations he has suffered bone involvement only with the single exception of empyema and this we feel was primarily due to osteomyelitis of the ribs from which he suffered a subsequent pleural invasion.

There are several interesting features exemplified in these 3 cases of osteomyelitis. Case III is interesting because of the genito-urinary complications which have arisen and the destructive process in the right hip. He unquestionably has had a pyelonephritis of the left kidney which we think must be hematogenous in origin and has resulted in a complete destruction of that organ so far as function is concerned. The calculi which have been demonstrated in both ureters we believe are secondary in occurrence to the infection. We feel that the right kidney has been the seat of a much milder infection which was probably ascending in origin and was secondary to that of the left kidney. This however may have been a blood borne infection. In view of a negative genito-urinary history and urinalyses on his two previous admissions and the absence of symptoms suggesting renal infection prior to October 11th which was the date of onset of his pyelonephritis we feel that our assump-

tion as to the sequence of development in this condition is probably correct at least it seems to be the most logical explanation of the process. There is the possibility that he may have a tuberculous infection of the left kidney with fibrocasseation and occlusion of the ureter. However I doubt this very much and feel that it is due to the staphylococcus. We feel that a nephrectomy on the left side should be done but should be postponed until he is in better condition as he has been steadily improving for the past several weeks.

The condition in the right hip we attribute to the general infection which he has suffered and feel that it is due to the staphylococcus even though he has not shown any external evidence of suppuration in or about the hip. We occasionally see this type of destruction in bones (particularly in the young) usually in the soft cancellous or cancellous end. With articular invasion a complete destruction of a joint may ensue without suppuration where the organism is not very virulent or has become attenuated or when the individual is recovering from a long standing infection. This may explain the insidious process in this patient's hip.

Case IV is interesting because of the type of infection. I have not seen another case where the infecting organism was the *Bacillus mucosus capulatus*. Under ordinary circumstances it is a rather benign organism and confines its mischief to the pulmonary tissue and serous membranes and is less virulent than the pneumococcus. Its behavior in this case was not that of the usual group of organisms producing suppuration in bone. The local symptoms (pain and tenderness) were not as marked as is usually the case in other pyogenic invasions of the same extent. Furthermore the purulent effusion in the knee joint did not recur after a single simple aspiration. The joint cavity was not irrigated and a germicidal agent injected at the time of aspiration. He is also interesting because there is no sequestration and because of the comparatively short time that was necessary to effect sterilization which was followed by prompt and complete healing of the wound.

In considering the etiology of this infection it is quite prob-

able that his illness during September and the early part of October which was diagnosed as influenza was due to the Friedlander bacillus and the osteomyelitis and knee joint infections which showed a pure culture of this organism were complications of the original infection

In a considerable percentage of acute suppurative bone infections the seat of the lesion is determined by trauma but in a greater percentage of these cases we have no outside factor such as injury to which we can ascribe the *locus minoris resistentiæ* of the affected part. In such cases the tissue involved depends upon the invasive power and the elective localization of the particular organisms after infection of the blood stream has taken place. This is also true of joint infections.

Some time ago we operated upon a young college student for a series of suppurative joint infections obtaining in pure culture from each joint the streptococcus. The joints invaded in succession were the left sternoclavicular, left wrist, right hip, right metacarpophalangeal of index finger, left shoulder and right knee. He finally succumbed to the infection after a two and a half months illness. At the time of death he showed signs of a pneumonia of the right lung with a fluctuating swelling in the left knee joint. This case is referred to as illustrating again the marked affinity that bacteria may show for certain tissue.

We believe that in most cases of acute hematogenous osteomyelitis where the lesion has not been determined by injury the infecting organism has a special affinity for osseous tissue. This applies in particular to infections where there is multiple involvement as is seen in Case V.

Early operation is imperative in these infections if the extensive loss of bone is to be prevented. Our usual operative procedure in infections of the long bones is to make a gutter through the cortex for the entire length of the infected area sufficiently wide to insure adequate drainage and to allow for the placement of a number of Carrel tubes through which the entire infected surface may be thoroughly irrigated with Dakin's solution. The principles of drainage in these infections does not differ essentially from the general principles applying to

the drainage of acute purulent collections elsewhere. In the drainage of a large abscess one would be contradicting the ordinary principles of surgery in draining through a button hole opening. The indications in such a condition would be for an incision sufficient to permit of free evacuation. This applies just as forcibly to the drainage of acute bone abscess. Acute suppurative osteomyelitis is more of a surgical emergency than is the average intra abdominal infection. Drainage should be secured as soon as the diagnosis is made and in many cases this is too late because failure in diagnosis is the error most commonly seen in the management of these cases.

Operation is done with as little injury as is possible to the medullary substance because of its important rôle in the regeneration of bone. We are not in accord with the view maintained by those who feel that trepanation is all that is necessary in these cases. Neither do we feel as some advocate that more extensive removal of the shaft than indicated above is called for. It is expected where late operation has been done that considerable sequestration will take place but here nature will determine more accurately the loss of bone than can the surgeon. It is the damage to the nutrient artery either from compression from unevacuated pus in the medulla or thrombosis of this vessel which gauges the amount of bone to be lost. We feel that trepanation in the virulent cases is not sufficient to obviate this danger if it has not already occurred in that it does not give adequate drainage and the intermedullary pressure is not at once entirely relieved. Furthermore the Carrel Dakin treatment which is of the utmost importance cannot be properly carried out. If extensive sequestration takes place as illustrated in Case III enucleation of the sequestrum is necessary but where smaller sequestræ form in children it may not always be necessary to remove them where the cavity of the involucrum can be sterilized. Under such conditions the sequestrum is absorbed just as a graft would be. This has happened in a case upon which I have operated. Briefly the management may be indicated in early diagnosis early operation with adequate drainage and Carrel Dakin sterilization.

## CLINIC OF DR BENJAMIN LIPSHUTZ

FROM THE SURGICAL SERVICE OF THE JEFFERSON HOSPITAL SERVICE  
OF DOCTOR J CHALMERS DaCOSTA

### ANATOMIC VARIATIONS AND SURGERY

THE surgery of today necessitates a wide knowledge of anatomy and embryology. A prominent surgeon recently recommended a study and basic understanding of embryology as one of the fundamental stones of surgical training. Cross anatomy even today is not without its problems many of them of vital and practical importance.

W J Mayo in discussing the relation of anatomy to present day surgery says always when I have faced a new problem in this field I have gone back to embryology anatomy and physiology in order to gain an idea of the meaning of these pathological deviations which we are called upon to treat.

Variations in the anatomy of the human body are not uncommon. Many variations in anatomy occur with a sufficient degree of frequency to justify the establishment of definite anatomic types. As J Parsons Schaeffer has put the problem the idea of an unvarying typical form in the gross anatomy of the human body appears more or less prevalent in the practical field. There is of course great need of extensive study of various regions organ and other structures of the body the conclusions to be based on a large number of cadavers. This has been done for some regions but the work must be extended to include all the important regions of the body. Such studies if based on a large amount of material and discriminating work will establish anatomic types. Roentgenology has been of great value in the determination and delineations of anatomic conformations. Many minor variations from a practical standpoint can be en-

tirely disregarded For example let us consider a few variations of the colon and their surgical importance

The normal position of the colon does not permit of any strict definition anatomic and x ray studies disclose considerable variations in its position length and mesenteric attachments *Abnormal fixation of the colon* may arise as the result of an arrested development Such abnormal fixations as are dependent on adhesions arising in gross inflammatory lesions as appendicitis are not here considered In a few cases transposition of the large intestine has been met with in that general

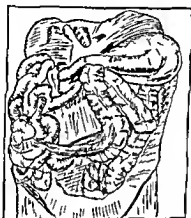


Fig 75—Abdominal viscera (dilatation of the cecum)  
Left dilatation (dilatation of the cecum)

anomalous condition known as transposition of viscera In a larger group partial or complete failure in the migration rotation and fixation of the U shaped loop is the cause of the abnormality This movement of the intestine during fetal life normally carries the cecum from the left side of the abdomen across the right hypochondrium and from there shortly after birth to the right iliac fossa The cecum may be arrested and remain in any part of its migratory course If migration fails a cecum may lie on the left side of the abdomen and may even occupy the left iliac fossa The latter type of cecal prolapse is

citis with left sided symptoms cases of this type have been reported by a number of surgeons (Fig 75)

Should rotation fail the axis of the cecum will be altered and the ileum will enter the cecum from the right instead of as is usual from the left side The cecum then lies on the left side of the abdomen and the ascending and descending colon are situated behind and to the left of the small bowel The same

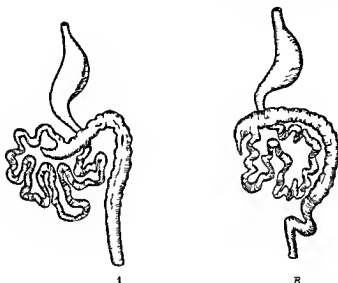


Fig 76—Sch m t p se t t f n l t g t t f m  
d l g t t A J t b f n l t t f m d t m l l m  
C vity f m d i d p h l d d t h ght T m l l m t  
l f m ght t l f t B R l l m p l e d C ca ty f m t  
ca d l d t h l f t T m l l m l l f m l f t ght ( d a p t d  
f m H g t )

relation has been observed in excessive rotation of the cecum that is more than 180 degrees and all degrees of variations between these two extremes may be expected to occur according to the more or less complete failure of the change in position which the U shaped loop normally develops

The cecum may be situated high up in the abdominal cavity the ascending colon being absent In the majority of fetuses



the cecum is situated in front of the right kidney near the gall bladder and there it remains until about the time of birth when the cecum and descending colon undergo a gradual migration toward the right iliac fossa. The cecum is the last portion of the large intestine to assume its permanent position (Figs 76-77).

The cause of this migration is probably due to a functional elongation of the proximal part of the colon but it occurs only in animals adapted to the upright position. The appendix

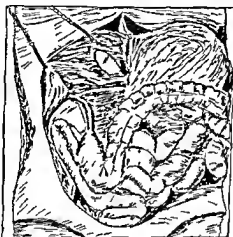


Fig. 77.—Ascending colon with appendix. Sigmoid flexure (Appendix vermiformis). (Adapted from Miller and Gott)

during the migration may be caught behind the cecum, thus assuming a retrocolic position; it is then lodged and fixed in the ascending mesocolon.

In a large percentage, possibly 25 per cent, of individuals the fusion between the peritoneum between the ascending or descending mesocolon is incomplete, resulting in a loop. It is well to remember that in fixation of the colon in an abnormal position where the misplacement is due to causes other than failure in the normal development of the U-shaped loop, thus abnormal fixation is always seen in the right iliac fossa. If the possibility

of such abnormalities be remembered it should not be difficult to recognize the different portions of the large intestine though in such cases the treatment must present considerable difficulties which must be met according to the conditions found in each individual case.

The peritoneal adhesions formed in the fourth and fifth month of fetal life between the transverse colon and the great omentum and especially the adhesions which the ascending colon forms just before and after birth as the cecum assumes its position in the iliac fossa are subject to a great range of variations and many peritoneal folds and recesses may be formed. Many of the latter variations have been variously designated in the literature as Lane's links, Jackson's membrane, Eastman's membrane, pericolic adhesions, etc. They have been regarded as the crystallization of the lines of force in the mesenteries formed in reaction to the downward tendency of the viscera for their object is to give fixation of the viscera to the abdominal wall, a fixation which occurs only in orthograde primates.

It is remarkable in how few cases these peritoneal bands are completely absent when carefully sought for during operations on the right iliac fossa.

#### COLON SIGMOIDEUM B N A (COLON ILIOPELVENUM AND PELVENUM)

The variations of the pelvic and iliac colon have been the subject of repeated anatomic study for many years both in the fetus and in the adult. Interest was first focused on the problem in an effort to ascertain the anatomic deficiencies in cases of atresia congenita ani. In the year 1859 the French surgeon Hugier made the observation that the apex of the loop of the sigmoid colon in the older fetus and in the newborn usually lies in the right iliac fossa and as a result of this observation recommended the performance of all artificial ani (anus practernaturalis) through an incision over the right iliac fossa. Whereas other observers of the same period particularly Giraldes who made their studies on adult material recommended the left iliac region as the preferable site for the artificial

anus. The controversy based on these two opposite opinions continued for many years many authorities supporting Hugier and an equally large number of authorities stoutly defending Giraldes opinion.

Anatomically both Hugier and Giraldes were correct as will be illustrated below. Conclusions drawn hastily and not verified by extensive anatomic study are not of infrequent occurrence. Both of the above expressed views have elements of truth and illustrate particularly that studies of anatomic structures should be made to include the newborn the several ages of the childhood period the pubertal stage and that of the adult.

The sigmoid colon is that portion of the large intestine between the descending colon and the rectum and is usually described as extending from the upper border of the iliac crests at which point the colon descendens terminates to the third sacral vertebra where the rectum begins. This part of the colon has been variously designated colon sigmoideum (B N A) flexura sigmoidea colon iliacum (so-called in the belief that this portion of the colon lies in the iliac fossa which frequently however is not the case) colon terminale etc. Treves and Schaefferdecker divide the colon ihopelvium into an upper and lower segment. Both noted the importance of the distal segment which was separately named *ansa sigmoidea* (Schaefferdecke) *ansa omega* (Treves). Jonnescu chooses the name *colon pelvium* for the lower or distal segment and *colon iliacum* for the upper or *proximal segment*. Toldt and Jacob recommend and use the name *colon ihopelvium* as including both segments of this part colon stating that this part of the large intestine usually lies both in the iliac fossa and in the pelvis. The latter name seems the best designation for it gives an accurate index of the typical position of this portion of the colon. The multiplicity of the anatomic names that have been used to designate the sigmoid colon is evidence of its anatomic variations.

Toward the end of the fetal period we find the pelvic colon attached by a long mesentery to the posterior abdominal wall the apex of the sigmoid loop lies high in the abdominal cavity

usually to the right of the median line less often is it found to the left of the median line The concavity of the sigmoid loop is directed below and to the left The tendency of the pelvic colon to present its convexity above and to the right is due to the influence of the rotation of the mesenterium commune upon the mesentery of the lower colon

The typical course of the pelvic colon in the newborn is as follows the pelvic colon usually begins at the level of the origin of the left external iliac artery at the medial border of the psoas major and takes a course to the right forming a loop the

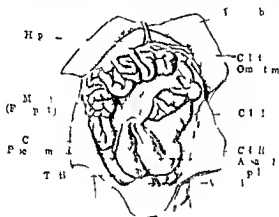


Fig 78—The type of sigmoid colon occurs approximately 80 per cent of newborn. F. d. scripta f. to t. x. t. (H. r. m. C. y.)

concavity of which is caudal and directed somewhat to the left. The apex of the loop is usually situated a little to the right of the median line rarely in the median line. The right border of the loop is in contact with the cecum and from a point to the right of the median line dips in the true pelvis (Fig 78). A few variations from this typical position which occurs in approximately 80 per cent of newborn are illustrated in Figs 79-82.

In many normal types of sigmoid colon the apex of the colon loop rests against the radix mesenterii. If the growth of the pelvic colon advances to an abnormal degree the loop or loops

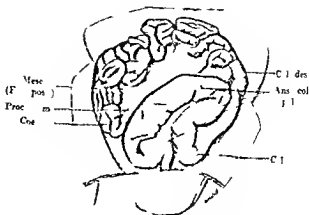


Fig 9—Represent the pex of the sigmoid loop and cecum and the 1 ft. (H man G<sub>3</sub>)

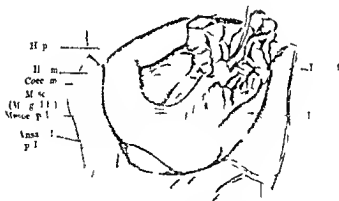


Fig 80—An enlarged sigmoid loop and the right half of the cecum. (H man G<sub>3</sub>)

of the sigmoid may lie in front of the cecum and appendix and in an operative approach of the right half of the sigmoid would first be encountered merely drawing

the sigmoid to the left exposes to view the cecum and appendix in these types of colons (Fig 83)

As noted above the narrowness of the pelvis in the newborn is the principal reason for the abdominal position of the sigmoid colon. In the adult this narrowness of the pelvis no longer is present and the sigmoid colon now sinks into the cavity of the pelvis. The course and relation of the sigmoid in the true pelvis essentially conforms to that described in all standard text books of anatomy and need not be presented here.

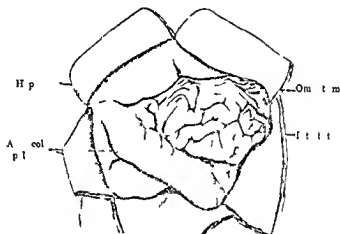


Fig 81—R p t l t th p t d l t f th  
gm d (H m Gy )

The sigmoid colon even in the adult may be entirely located in the abdominal cavity and not in the pelvis as was pointed out by Jonnescu. The abdominal position of the sigmoid colon is the result of one or two factors: (1) An unusual extraordinary increase in size (physiologic or pathologic) of the other viscera of the pelvis (bladder, uterus, ampull recti); (2) extraordinary enlargement of the sigmoid colon.

In the first group the relations are similar to those observed in the newborn. As noted in the description of the sigmoid

colon of the newborn the pelvic colon rests against the posterior abdominal wall and the apex of the loop usually lies to the right of the median line

The sigmoid is the most variable portion of the colon. The proximal or iliac portion usually lies in the iliac fossa the distal

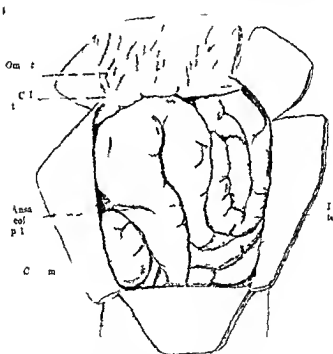


Fig 32—An unusually distended filling half the abdominal cavity (H. M. Gy.)

or pelvic in the true pelvis. The ascending or proximal iliac loop usually takes a vertical or slightly curved cephalically directed course and is not infrequently fixed to the parietal peritoneum of the posterior abdominal wall by a peritoneal band or fold which fixes the iliac colon in a position parallel and to the right of the colon descendens. The mesentery of

the sigmoid colon in the latter types of colon is attached only to the distal loop. In a number of the cadavers examined the mesentery of the entire sigmoid colon was so short that the entire sigmoid colon was practically fixed. In the latter types of sigmoid colon the distal loop is at times very small, the proximal loop immediately joining the rectum.

The particular surgical importance of the latter types of sigmoid colons is the impossibility of delivering the sigmoid colon into an operative incision without initial mobilization.

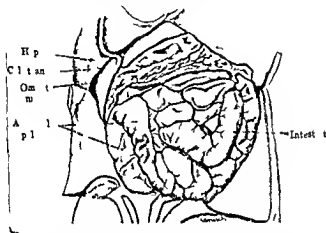


Fig 83—Large gm doc pyingth ght d fth bd m d bsc g  
f m v w c e m d p p e d (H ma Gys)

through an incision of the parietal peritoneum. Fixation of the sigmoid colon occurs in 5 to 8 per cent of all colons and accounts for the occasional difficulty encountered by the surgeon in the attempt to deliver the sigmoid colon for immobilization as the initial step in the performance of a colostomy or other surgical procedures on the sigmoid.

In the typical position of the sigmoid colon the cephalic limit of the loop does not extend above the umbilicus. A persistence of a number of fetal positions as illustrated above may be present in the adult and can account for an abnormally



high situation of the sigmoid colon. The apex of the sigmoid loop may have a position above the umbilicus and lie against the liver, stomach or spleen. In such cases the pelvic colon often forms one large loop lying in front of the small intestine and directly against the anterior abdominal wall. These types of pelvic colon at times may encase a loop of the ileum particularly if the pelvic loop is directed toward the right (Fig. 84).

The redundancy of the sigmoid is practically always limited to the distal or pelvic loop and this portion of the sigmoid is the most common site of the volvulus. In extreme cases the pelvic loop of the sigmoid seems to fill the entire abdominal cavity.

Recently the writer encountered at operation an enormously and widely dilated redundant sigmoid with a mesosigmoid whose



Fig. 84—Schematic representation of the dilated sigmoid with loop of the ileum.

base was about 4 cm. and its length and height 4 and 16 cm. respectively. The widely dilated sigmoid loops had sagged downward accentuating the normal angulation at the point where the descending colon joins the iliac loop of the sigmoid, resulting in a true kink and producing symptoms of intestinal obstruction.

Redundancy of the sigmoid is usually associated with an unusually large mesosigmoid allowing free mobility; the latter types are the ones which are likely to become the site of volvulus or abnormal angulations.

In conclusion, admittedly very many variations are insignificant and can be ignored in the practical field despite the

fact that they may be of great interest to the student of embryology and morphology. However it is a matter of grave concern to the physician and surgeon that many important variations and anomalies must be dealt with continually. It is therefore clearly obvious that the adherence to a single fixed and arbitrary normal is fraught with danger since with variations come altered size altered shape altered anatomic relations. Morphologic variation must necessarily have an important bearing on physical diagnosis pathology clinical medicine and surgery. Indeed the anatomic type always looms up before the man in the practical field as an important factor in treatment and prognosis (Schaeffer).

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Fig. 84—Schmatz presentation of the sigmoid colon with a large mesosigmoid.

base was about 7 cm. and its length and height 24 and 16 cm. respectively. The widely dilated sigmoid loops had sagged downward accentuating the normal angulation at the point where the descending colon joins the iliac loop of the sigmoid resulting in a true kink and producing symptoms of intestinal obstruction.

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## CLINIC OF DR I S RAVDIN

### UNIVERSITY HOSPITAL

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#### LUMBAR HERNIA THROUGH GRYNFELDT AND LESSHAFT'S TRIANGLE

LUMBAR hernia was first mentioned by Barbette in the seventeenth century. Two types have been described—the high and the low. Both types are infrequent, the high being supposedly much rarer than the low. The left side is said to be more often the site than the right, and there is a divergence of opinion as to whether it is more common in the male than in the female. Although they are more apt to occur in elderly individual with poorly nourished and relaxed tissues, the lesion may be congenital—Budeon reported a congenital case as early as 1728. In the discussion of true lumbar hernia we should not include those hernia which are the direct result of trauma, suppuration, or operations in the loin region. However, from the standpoint of treatment, the principles of repair may be analogous.

E. A. male, aged forty, was admitted November 5, 1922, complaining of a bulging in the left loin. He stated that two years previously he was stabbed in the left infracostal region posteriorly, which wound was sutured and healed by primary intention. During the spring of 1922 he had a sensation of weakness in the left loin and he noticed a gradually increasing bulging in the upper loin space. This became so annoying that he sought relief at a hospital, where he was told that he had a lumbar hernia and was advised to be operated on. An operation was performed in July, 1922. In September the sensation of weakness in his side returned, and soon after this he again noticed a bulging in the region of the scar.



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**Physical Examination**—The patient is a white fairly well developed male of somewhat flabby musculature. The only abnormal findings are in the left loin space just below the twelfth rib and to the outer side of the erector spinæ muscle is a scar about 1 inches long the site of the stab wound. Below this is a long oblique scar (Bergman incision). This scar forms the summit of a bulging mass which is about the size of an orange. When the patient is recumbent the bulging disappears and when he resumes an upright posture it gradually reappears. When pressure is made over the area and the patient coughs an impulse is felt.

A diagnosis of recurrent lumbar hernia through the fascial triangle was made.

A knowledge of the anatomy of the muscles and fascia which make up the posterior abdominal wall between the 12th rib and the iliac crest is of the utmost importance in order to clearly understand the surgical relations in lumbar hernia. The space varies according to the length of the twelfth rib and according to the type of chest with its effect upon the position of the ribs. Thus in the slender individual with acutely sloping rib the space is decreased while in the emphysematous type the space is increased. The tip of the twelfth rib in the average person lies about 2 inches vertically above the center of the iliac crest.

The costo-iliac space is limited medially by the lateral edge of the sacrospinalis laterally by the posterior border of the external oblique while the entire space is covered posteriorly by the tendon of origin and muscle fibers of the latissimus dorsi except in its lower part where a narrow triangle is left between the lateral border of the latissimus dorsi and the posterior fibers of the external oblique.

This triangle known as Petit's triangle is a space of variable size. Below it is bound by the upper margin of the posterior portion of the iliac crest. Laterally is the posterior edge of the external abdominal oblique muscle and medially it is bounded by the lateral edge of the latissimus dorsi muscle. The floor is formed by the lower posterior fibers of the internal oblique.

while in front of the c lies the tendon of origin of the transverse abdominal and quadratus lumborum muscles (Fig 85)

In a well muscled individual the latissimus dorsi and the external oblique may overlap obliterating the triangle Goodman and Speese in 76 dissections found the triangle missing



Fig 85 — a C dg fl m d b se t po t f  
f lat t gl h g loc t f sa d t rn l bl q t l  
bl q f t f P t t t gl h q d t l mb m

12 times on both sides and 4 times on one side only. In the anatomical laboratory a great variation in the size of the base of the triangle is seen. The triangle also differs from the upper triangle in that neither nerve nor vessels pierce its floor.

After removing the latissimus dorsi and removing or retracting the lower digitation of the serratus posterior inferior



the upper larger triangle is exposed. This is the second weak point of the loins and is known as the fascial or Grynfeldt and Lesshaft's triangle. It is more constant than the lower or Petit's triangle. The shape and size of both vary. It is bounded above by the lower edge of the twelfth rib, medially by the sacrospinalis and quadratus lumborum, and laterally by the posterior fibers of the internal oblique. The floor is fascial, being the site of the fusion of the lumbodorsal fascia which anteriorly forms the aponeurosis of the transversus abdominis and posteriorly splits into three layers to enclose the sacrospinalis and quadratus

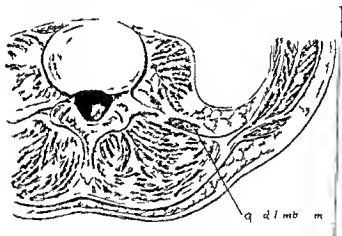


Fig. 86—The natural triangle created through the fascial triangle.

lumborum (Fig. 86). While the middle and posterior layers are dense, the anterior is very thin and is continuous with the transversus abdominis fascia. There is no muscle to buttress the floor in this upper triangle except occasionally the thin outer third of the quadratus lumborum which may lie external to the sacrospinalis. The space is further weakened by the twelfth intercostal nerve and vessels passing through it. Grynfeldt in 1860, in describing this space said: "The aponeurotic fibers of the

transversalis in dividing form a space for the lower intercostal artery just as the sperm cord enters the two pillars of the external ring

**Operation**—I S R Ether anesthesia The patient was put on his right side and a kidney pillow placed under the right loin. An oblique incision was used excising the previous scar. The peritoneal sac was found beneath the latissimus dorsi aponeurosis and dissection was continued until its base was exposed. The



Fig 87—Sartorius dorsi exposed

outer and inner muscular fibers of the latissimus dorsi quadratus lumborum and internal oblique were exposed and freed so that they could be overlapped without tension. The lumbo-dorsal fascia was likewise freed. The left thigh which had previously been prepared was exposed and through an H shaped incision a piece of the fascia lata about 6 inches square was removed and placed in warm normal salt solution. The kidney pillow was removed.

The peritoneal sac was then inverted and oversewn with chromic catgut (Fig 87) The aponeurosis of the transversalis was then brought together and reinforced with a piece of the

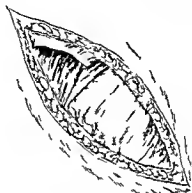


Fig 88—First piece of fascia lata placed

fascia lata which was attached above to the periosteum of the twelfth rib medially to the under surface of the quadratus lum

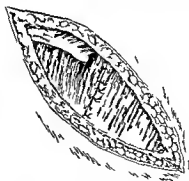


Fig 89—Internal oblique and quadratus lumborum together

borum and laterally to the transversus abdominis and internal oblique (Fig 88) The internal oblique and quadratus were brought together without undue tension with interrupted sutures

(Fig. 89) The latissimus dorsi was then closed (Fig. 90) and the remaining piece of the fascia lata was sutured over this and attached anteriorly to the posterior fibers of the external oblique

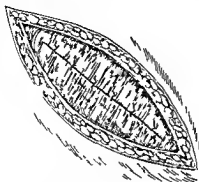


Fig. 90—Latissimus dorsi closed

(Fig. 91) The skin was closed with interrupted sutures of silk worm gut

The patient made an uneventful recovery being allowed



Fig. 91—Latissimus fasciata in place

out of bed in three weeks. When seen on January 15, 1923, there was no evidence of weakness of the posterior abdominal wall. There was, however, a small collection of serum in the thigh.

The peritoneal sac was then inverted and oversewed with chromic catgut (Fig 87) The aponeurosis of the transversalis was then brought to ether and reinforced with a piece of the

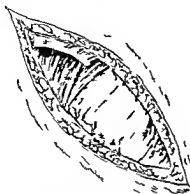


Fig 83—First piece of fascia lata placed

fascia lata which was attached above to the periosteum of the twelfth rib medially to the under surface of the quadratus lumborum

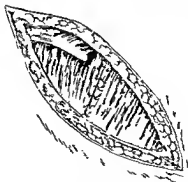


Fig 89—Internal oblique and quadratus lumborum sutured

to the transversus abdominis and internal oblique (Fig 88) The internal oblique and quadratus were brought to ether without undue tension with interrupted sutures

## RUPTURED GRAAFIAN FOLLICLE SIMULATING APPENDICITIS

ACUTE pain in the right iliac fossa is suggestive of acute appendicitis. When to this pain is added vomiting a slight rise of temperature a rapid pulse rigidity of the right rectus and a leukocytosis the picture of acute appendicitis seems fairly complete. The following case illustrates the difficulty of differential diagnosis.

M. S. aged fourteen years was admitted to the hospital at 5 P. M. 1/29/22. I had seen the patient about 3 o'clock in consultation with Dr. Leebron. On the morning of the day of admission she developed severe colicky pain in the right lower abdomen. She had a similar attack a year previously from which she recovered. During each menstrual period right sided abdominal pain was present but to a much less degree. She was nauseated but did not vomit until after admission to the hospital. Her bowels were regular and she had had a movement in the morning.

Her previous history was negative. The last period was completed four days before admission. The menses were regular and lasted from two to three days. The flow was normal but rather painful. The menstrual cycle began six months ago.

The physical examination was negative except for the abdominal findings. There was little if any distention. The tenderness was limited to the right lower abdomen being most exquisite in the region of McBurney's point. The entire right side was rigid. No masses were palpable. Rectal examination was so painful that a thorough examination was impossible. Peristalsis was exaggerated.

The blood count was

R d blood-cell	4 100 000	P lymo ph	1 rs	75 pe ce t
Wh t blood-cell	16 400	Small lymphocyt		2
Hb	69 pe ce t	T t	1	2
		Ec	ph l	1

where the fascial graft had been removed. I do not know why this had not been absorbed after so long a time.

It may be said that this was not a true lumbar hernia since the stab-wound may have contributed to the weakness of the abdominal wall. The operation described however is suitable for the repair of a hernia in this region regardless to the etiology since it is based on the anatomic relations of the region. Even if a hernia occurred following suppurative processes with extensive scar tissue supplanting in part the muscular tissue I believe that the fascial transplant offers the best chance of permanent cure.

The question has been raised as to whether or not a sac is present. In this case the sac was well developed and was similar to the sac found in the umbilical hernia. I do not know what the sac contained since I did not open it but it might contain omentum large or small gut or possibly the kidney. Cases have been reported that have been strangulated but this is not the rule since they are usually easily reducible.

Although the text books on anatomy and surgery place more emphasis on Petit's triangle as the site of lumbar hernia I believe a careful investigation would show that hernia through the space of Grynfeldt and Lesshaft is much more frequent.

In all about 500 c c of blood were found in the peritoneal cavity. As much of the blood and as many clots were removed as possible. The peritoneum was closed as usual the internal oblique repaired and the remainder of the incision was closed with interrupted catgut sutures. Michel clips were used for the skin.

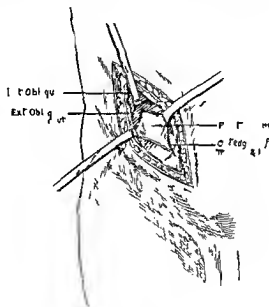


Fig 93—The total abdominal incision for the treatment of the ruptured Graafian follicle.

The pathologic report was: Graafian follicle perforated. Passive congestion of the ovary with interstitial hemorrhage, slight fibrosis.

The patient had an uneventful convalescence and was discharged February 13th completely recovered.

Both Dr. Muller and myself have found the modification of the McBurney incision as shown in the accompanying illustration (Fig 93) very useful when greater exposure was necessary because of a low lying appendix or pelvic lesion. None of these patients have developed incisional herniae. It is important to



Urinalysis was negative for sugar albumin casts leukocytes or erythrocytes

Temperature was 99.3 F pulse 114 respiration 24

I made a diagnosis of acute appendicitis and decided upon immediate operation

Operation—I S R Ether anesthesia McBurney incision Before the peritoneum was opened the blue black color of the blood showed clearly through it and the intern who was assisting mentioned the possibility of a ruptured graafian follicle The peritoneum was opened and free blood escaped The appendix

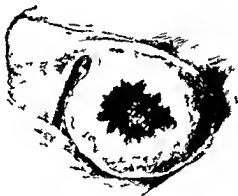


Fig 9 —Ovary showing perforation

which immediately presented was found to be normal The incision was lengthened the fibers of the internal oblique were cut across at right angles to the direction of the wound and the peritoneal opening enlarged This gave an excellent exposure of the right tube and ovary which were delivered A perforated follicle on the posterior surface of the right ovary was found from the interior of which active bleeding was taking place (Fig 9) The cavity was about 1 inch in diameter and the perforation was about 1 cm in length The cyst and a portion of the ovary were removed and the remainder of the ovarian tissue ligated

until the period of regression of the corpus luteum is nearly completed

It is as yet a moot point whether the hemorrhage is more frequent from the atretic or from the graafian follicles. During the formation of the atretic follicle the tunica interna gives rise to lutein cells of connective tissue origin which are highly vascularized. Hemorrhage from these may occur at any period in the menstrual cycle but it is more likely to occur at the time of menstruation with its accompanying pelvic hyperemia.

The accident occurs usually in young women. In the young virgin it is most frequently diagnosed as acute appendicitis as in the preceding case while in the married woman it may be confused with either appendicitis or ectopic pregnancy.

The amount of bleeding varies from the amount which normally occurs with each ovulation to massive hemorrhage causing early exodus. Schuman has reported 3 cases in young girls who displayed all the phenomena of intraperitoneal hemorrhage but were treated expectantly and recovered. In the cases of massive hemorrhage pallor and air hunger together with an anemia and a pelvic mass may aid in the differential diagnosis.

Should the possibility of ovarian hemorrhage be kept in mind a positive diagnosis might be made before operation. However I feel that should the diagnosis be made it would be better to operate regardless of the severity of the symptoms present because certainty of diagnosis cannot be assured without laparotomy or the possibilities of continued bleeding be calculated.

bear this in mind since it obviates the necessity of closing the incision and making a right rectus incision

Nelaton as early as 1851 was aware of the possibility of hemorrhage from a ruptured graafian follicle. Novack reviewed the literature up to 1917 and found 40 cases which he was willing to classify as ovarian hemorrhage except that from ovarian pregnancies and ruptured large ovarian cysts and solid tumors. 36 of the cases had been collected previously by Von Beust in 1914. Since Novack's contribution Neer-Smith and Penn have added cases. Recently several other reports have appeared in the literature including reports such as that of Schuman where the tentative diagnosis was made and the patient treated expectantly.

Clinically ovarian hemorrhage may be divided into the following groups

- 1 That due to rupture of a graafian follicle or corpus luteum
- 2 That occurring from perforation of a hematoma of the stroma of the ovary
- 3 That occurring from atretic follicular cysts
- 4 That occurring from ruptured ovarian cysts or solid tumors
- 5 That occurring as the result of ovarian pregnancy

The rupture of a graafian follicle or corpus luteum with extensive hemorrhage may occur just before *dunn* or just after menstruation. No cases have been reported as occurring previous to menstrual life or after its cessation.

The tunica interna in the maturing graafian follicle contains an extensive plexus of minute blood vessels from the tunica externa which are continued into the *membrana granulosa*. After the rupture of the follicle with the discharge of the ovum the formation of the corpus luteum begins. In the earliest stage of the formation of the luteum cells which are probably hypertrophied epithelial cells of the *membrana granulosa* there occurs the so-called period of *hyperemia*. During this period thin walled bud like projections of the vascular plexus are found in the corpus luteum. The *membrana granulosa* vessels become smaller when the corpus luteum is completed but the vessels in the tunica interna and the externa remain prominent.

# NEUROSURGICAL CLINIC OF DR CHARLES H FRAZIER

UNIVERSITY HOSPITAL

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## UNILATERAL EXOPHTHALMOS A CLINICAL REPORT OF FIVE CASES

(RECEIVED BY DR. K. L. MUELLER NOV. 1923)

THE occurrence of unilateral exophthalmos is by no means rare. Regardless of its frequency as a symptom individuals presenting this finding are always worthy of intensive and thorough study on account of the variety of factors which may be concerned in the etiology and the difficulty which is sometimes encountered in arriving at a definite diagnosis. Through the courtesy of Dr. Charles H. Frazier the following cases having in common this one symptom—i. e. unilateral exophthalmos—which were recently studied by the neurosurgical service at the University Hospital are here presented.

Illustrative of the fact that the diagnosis of this condition is not always obvious and is frequently difficult we may consider the case of an adult male aged forty years who was admitted to the neurosurgical service complaining of headache and nausea. Three years before he had developed gradual loss of vision of the right eye. On admission this eye was totally blind. In March 1922 he had his initial attack of pain and vomiting. This pain was located in the frontal region, was dull, constant, neuritic in type and persisted for about seven days. He was then free from subjective symptoms, excluding his unilateral blindness, until nine months later when his subjective symptoms returned. From that time until admission in January 1923 more or less pain had been constantly present and vomiting was a frequent occurrence. Two days before coming to the hospital ptosis of the right eyelid developed.



No loss of visual acuity was associated no febrile phenomena nor leukocytosis Her right eye was decidedly exophthalmic the supra orbital margin puffy the skin of this region as well as that of the right lid boggy with edema Downward and inward deviation of the globe was present There was paresis of all the extra ocular muscles Blood and spinal fluid were negative x Ray pictures showed some clouding of the right ethmoid air cells

Exploration of these spaces was decided upon and was performed by Dr David Husick A considerable quantity of pus was found and evacuated In a few days she was discharged relieved of pain Five weeks later she returned her exophthalmos much more marked than on discharge Pain was not a prominent symptom but on account of a sensation of abnormal fullness in the right eye she was very uncomfortable A mass could be easily seen and palpated beneath the supra orbital ridge in the upper and outer orbital quadrant Although the existence of an orbital abscess was suspected the absence of fever leukocytosis and the general symptoms of infection made this supposition rather questionable It was thought that there possibly existed a neoplasm of the orbit which had been developing prior to the sinus infection and which at about the same time began to manifest itself Regardless of the nature of the lesion exploration was indicated Dr Frazier performed this operation approaching the orbit from beneath the supra orbital ridge A large subperiosteal abscess communicating with neither the tissues of the orbit nor with any of the adjacent air spaces was found evacuated and closed with a Dakin tube *in situ* The patient made an uneventful recovery

Illustrative of the gravity with which unilateral exophthalmos may be attended let us consider the case of a forty year old female who was admitted with a chief complaint of headache fever chills and protrusion of the left eye Four weeks before she had had a slight attack of laryngitis from which she apparently entirely recovered About a week later she began to have headaches occipital at first later generalized These headaches were extremely intense constant and throbbing

With the exception of the findings associated with the right eye physical examination was entirely negative. An examination by Dr. DeSchweinitz revealed ptosis of the right lid, absence of light perception, an inactive iris, and a slight degree of exophthalmos, 4 mm. in advance of the opposite side. Complete atrophy of the optic nerve had taken place; upward and outward motion was markedly limited. The left eye retained normal vision, fundus field, and motion.

The spinal fluid pressure was found to be slightly elevated, 22 mm. of mercury. A cell count showed 10 cells per cubic millimeter. All other laboratory studies were negative.

Taking into consideration the increase of spinal fluid tension, it was thought that quite likely an intracranial lesion was responsible for the condition. X-rays taken elsewhere indicated some slight thickening of the tissues about the apex of the orbit. An orbital tumor was considered another possibility. It was decided to explore the orbit, withholding more radical intracranial procedures until orbital growth could be certainly ruled out. This was done by Dr. Frazier, using the Kronlein method of approach. The outer and upper walls, the boundaries under suspicion, were thoroughly inspected. No tumor was found. The patient is convalescing nicely from this procedure and to date has had entire relief from both pain and vomiting. The etiology of the condition, giving rise to the exophthalmos, however, is still undiscovered. No subsidence of the protrusion has occurred. Does a tumor actually exist, perhaps primary in the optic nerve or in some other portion of the orbit which our exploration has failed to reveal? Does an intracranial lesion exist which has given rise to this unilateral symptom? These questions can be answered only by further study, investigation, and perhaps operation.

That the conclusion, diagnosis, of orbital abscess, is not always a simple matter is illustrated by the case of a middle-aged Jewish female who came to the hospital early in December, 1922, complaining of pain and protrusion of the right eye. The pain had persisted for eight weeks. It was sharp, throbbing, and continuous, most marked in the orbit and supra-orbital regions.

No loss of visual acuity was associated no febrile phenomena nor leukocytosis. Her right eye was decidedly exophthalmic the supra-orbital margin puffy the skin of this region as well as that of the right lid boggy with edema. Downward and inward deviation of the globe was present. There was paresis of all the extra ocular muscles. Blood and spinal fluid were negative. x Ray pictures showed some clouding of the right ethmoid air cells.

Exploration of these spaces was decided upon and was performed by Dr. David Husick. A considerable quantity of pus was found and evacuated. In a few days she was discharged relieved of pain. Five weeks later she returned her exophthalmos much more marked than on discharge. Pain was not a prominent symptom but on account of a sensation of abnormal fullness in the right eye she was very uncomfortable. A mass could be easily seen and palpated beneath the supra orbital ridge in the upper and outer orbital quadrant. Although the existence of an orbital abscess was suspected the absence of fever leukocytosis and the general symptoms of infection made this supposition rather questionable. It was thought that there possibly existed a neoplasm of the orbit which had been developing prior to the sinus infection and which at about the same time began to manifest itself. Regardless of the nature of the lesion exploration was indicated. Dr. Frazier performed this operation approaching the orbit from beneath the supra orbital ridge. A large subperiosteal abscess communicating with neither the tissues of the orbit nor with any of the adjacent air spaces was found evacuated and closed with a Dakin tube in situ. The patient made an uneventful recovery.

Illustrative of the gravity with which unilateral exophthalmos may be attended let us consider the case of a forty year-old female who was admitted with a chief complaint of headache fever chills and protrusion of the left eye. Four weeks before she had had a slight attack of laryngitis from which she apparently entirely recovered. About a week later she began to have headaches occipital at first later generalized. These headaches were extremely intense constant and throbbing.



Although not a neurotic individual she frequently screamed with pain. Two days before admission she had elevation of temperature for the first time. Twice she had been shaken by severe chills associated with an axillary temperature of 107° F. Twenty-four hours before coming to the hospital marked swelling and protrusion of the left eye had occurred. Upon admission she was mentally clear, temperature by axilla 103° F, leukocytes 23,000. The left eye showed marked proptosis, a chemotic conjunctiva, complete ophthalmoplegia and was exquisitely tender. The fundus was negative except for haziness of the upper disk margin. Slight redness and edema of the lids was the only abnormal finding in the right eye. The angles of both jaws were tender to pressure and the mouth could be opened to but half the normal limit. Both sides of the face were slightly swollen. X-ray examination by Dr. Pancoast was negative except for slight clouding of the left maxillary sinus. A diagnosis of cavernous sinus thrombosis was made.

In the hope that this diagnosis was incorrect exploration of the left antrum of the maxilla and the left ethmoid air cells was made. No pus was found nor was the condition of the patient relieved. It was then considered best to explore the orbit in the hope of finding an abscess and establishing drainage. This was done by Dr. Frazier with negative results. At the same time intracranial exploration was performed by an approach superior to the left frontal sinus. The cerebral cavity was examined extradurally as far posteriorly as the cribriform plate. No evidence of abscess was present, symptoms were not relieved. Blood cultures taken on two occasions showed no growth. Her mentality was undisturbed. She continued to show wide temperature fluctuations—100° to 104° degrees—the exacerbations being accompanied by severe rigors. The left eye became more and more prominent and showed slight bluish discoloration. The appearance of the right eye began to approximate that of the left on admission. Her skin assumed an icteroid hue, she became more and more toxic, severe diarrhea developed and death occurred seven days after admission and four days after operation. Autopsy was refused.

Here is a case of exophthalmos obviously infective in origin the infection being extremely virulent and malignant in nature. Although at all times the diagnosis of that most dramatic and tragic of orbital infection — the cavernous sinus thrombosis — was considered practically certain operative interference was instituted in the hope that the diagnosis was faulty and that possibly something could be done. The source of the infection is uncertain. Was the slight laryngitis preceding the onset of symptoms in any way associated? Did a cerebral abscess exist which by continuity involved the blood space affected? These are questions upon which in the absence of postmortem findings one can only speculate.

Another condition which can give rise to this one-sided physical finding is demonstrated by a thirty-six-year-old female who came to us on account of pain in and above the left eye. This pain had been intermittently present for the preceding six years, was paroxysmal in type, quite severe and at first readily relieved by aspirin. Changes in the weather, excitement and anxiety seemed to institute or aggravate the pain.

On admission she complained of constant pain. This pain was located in the eye itself, along the left side of the nose and in the left temple. Occasionally she had attacks of vomiting. This she attributed to medicines taken. Examination showed ptosis of the left upper lid, almost complete paralysis of the extraocular muscles, moderate exophthalmos, normal pupillary reactions with no abnormal fundus or visual field findings. She was seen by Dr. Spiller and Dr. Dercum in consultation with Dr. Frazier, who agreed that there was evidence of involvement of the left third, fourth, fifth, sixth, seventh, eighth, ninth and tenth cranial nerves. A lesion, neoplastic or inflammatory, located at the base, flat and plaque-like in type, involving the nerves mentioned at the points of emergence from the skull was thought to be the most plausible explanation. The family would consent to no operative interference. A rigid rest cure indicated by the patient's undoubted neurotic tendencies was instituted and carried out with slight if any improvement. Upon request of her family she was discharged one month after admission.

Here you may rightly say that in the presence of so many other and more significant symptoms and findings the importance of the proptosis was practically negligible. Its presence however merely serves to illustrate another condition with which it may be present—a paralysis of the musculature of the orbit.

There is a special group of cases of which a considerable number have been reported in the literature which can readily be explained upon physical grounds. A seven-year-old boy admitted to the service of Dr. deSchweinitz and later transferred to the neuro-surgical service for operation serves to illustrate this interesting condition. Briefly his history is as follows:

Two years before coming to this hospital he experienced a fall of six feet at which time he fractured his right clavicle and received a blow upon the head. Six weeks later his father a physician noticed distention of the left angular vein. A distinct thrill was palpable over this area. This distention progressed and was associated with a definite advancing pulsating exophthalmos. Ligation of the left common carotid artery was performed at the Mayo Clinic in July, 1921. Slight improvement of the exophthalmos followed. Three months later resection of the dilated angular veins was performed subsequent to which the exophthalmos became more pronounced and dilatation of the conjunctival veins occurred.

Examination on admission revealed a healthy normal boy with no evidence of constitutional disease. The left eye showed pronounced exophthalmos associated with moderate pulsation. The veins of the palpebral and bulbar conjunctivæ those of the upper and lower lids of the temple and left forehead were markedly distended. The entire area had a purplish tinge. A loud bruit could be heard over the left side of the head most intense in the temporal region. Subjectively he complained of whirling noises in his head. Pressure over the left jugular vein caused almost complete disappearance of the bruit. Compression of the right common carotid artery had a similar effect. Vision of the affected eye was not impaired. A diagnosis of pulsating exophthalmos the result of arterio-aneurysm of the internal carotid artery and the cavernous sinus was made and operation

advised. An operation was performed by Dr. Frazier which consisted of a gradual obliteration of the lumen of the right internal carotid artery first by arterial clamp ten days later by ligation. The procedure was well tolerated. Two weeks later he was discharged with no appreciable improvement in his eye protrusion the sensation of buzzing in his head however having almost entirely disappeared.

It is our hope that the meager details of the cases presented will to some extent illustrate this interesting and sometimes rather complex symptom of unilateral exophthalmos. It should be within the power of the investigator to discover a physiologic physical explanation for all cases of exophthalmos involving one or both eyes. When one alone is involved we can almost surely eliminate a systemic or general condition such for example as toxic goiter. Under such conditions the failure to locate the combination of physical and physiologic conditions which is responsible for the symptom is a confession of our inadequacy.

In the study and investigation of cases presenting this unilateral condition it is necessary to bear in mind the variety of lesions which may contribute and give rise to such a situation and by the process of elimination arrive at a correct diagnosis. We must take account of the mechanical factors. Has the orbital space been decreased by invasion of neoplastic cystic or inflammatory tissue? Are the orbital vessels themselves the cause of the disturbance? Can the nerves and muscles be at fault? Is there modification of refractive power due to alteration of the axes of the bulb the result of compression? What fundus changes have taken place? Has trauma occurred subsequent to which there is emphysema of the orbital tissues or alteration of the adjacent blood vessels? What is the condition of the osseous air spaces which are such close and important neighbors to the orbit? Does constitutional disease exist and if so what is its relation to the condition? Is there hemorrhage relaxation of orbital tissues sympathetic involvement evidence of intracranial disease glaucoma pulsation inflammation edema or suppuration? These questions must be answered before in a condition such as this we can diagnose prognosticate or treat.



## CLINIC OF DR. FRANCIS C. GRANT

FROM THE NEUROSURGICAL SERVICE OF THE GRADUATE SCHOOL OF  
MEDICINE OF UNIVERSITY OF PENNSYLVANIA

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### THE USE OF AIR IN THE DIAGNOSIS OF INTRACRANIAL LESIONS AN ILLUSTRATIVE CASE

THE use of air as a medium for determining the size and shape of the cerebral ventricles originated with Dandy. He first used it to indicate the position of the obstruction in cases of hydrocephalus. As it was found that the outline of the ventricles could be clearly demonstrated and any change in their outline or position easily seen, the diagnostic possibilities of the procedure in cases of new growth with or without an accompanying hydrocephalus were realized. In order to outline the ventricles on an x-ray plate a medium either more or less dense than the surrounding bone must be used. No substance more dense than the bone has been found that is not too toxic to be injected into the brain. Air shows on the x-ray plate as an area of decreased density. It is less dense than the cranial bones. The injection of air into the ventricles produces no toxic effect.

The present case illustrates a further use of air in the diagnosis and localization of cranial lesions. If at the operating table a deep seated cyst is encountered it is the part of wisdom to attempt to determine the size and location of the cyst before an effort is made to remove it. This is particularly true if the cyst is glomatous in origin. If on introducing an exploring cannula a clear canary yellow fluid is obtained this finding is pathognomonic of a glomatous growth which has undergone cystic degeneration. The presence of a glomatous growth complicates the operative procedure. These tumors are infiltrative in character and commonly unencapsulated. For reasons not clearly understood patients having glomatous

tumors quite commonly show marked reaction after the simplest operative interference. Since it is almost impossible to extirpate a large glioma *en masse* and since any such maneuver would with certainty be followed by the onset of a cerebral edema and extreme danger to the patient whenever a large cyst evidently gliomatous is encountered an attempt should be made to localize its position. The surgeon can then decide whether it is possible to attack it successfully at a second operation or whether it is wiser to leave it alone. Once its position is known it may be treated by repeated tapping and intense radiation if removal seems out of the question.

This is precisely the problem that faced us in this case. The dura on opening the skull was very tense. In attempt to tap the left ventricle for the relief of this tension the exploring cannula entered a cyst and evacuated 5 c c of yellowish fluid. A diagnosis of a large gliomatous cyst was made. Even after we had removed about 5 c c of fluid from one part of the cyst and tapped the ventricle on the other side the tenseness was but little relieved. The dura was opened for about an inch and the brain at once commenced to herniate out through the opening an ominous sign showing that the brain would swell and bring on a serious degree of medullary compression on little provocation. The cyst was therefore again tapped rather to our surprise an even larger amount of fluid was evacuated and an equal amount of air injected. The wound was now closed without difficulty and the patient taken to the x ray department. The clearness with which the position and size of the cyst may be seen is evident from the accompanying plates.

**Case History**—T S aged forty six years white laborer admitted to the service of Dr T H Weisenburg Polyclinic Hospital Graduate School of Medicine University of Pennsylvania 10/3/22

*Chief Complaint*—Headache

*History of Present Condition*—The patient has had headaches in the left frontal region for the past six months. These headaches came on with no apparent cause. Previous to admission the headaches were terrific but recently they have been dull

These pains were located at first in the occipital region now they are frontal in position particularly on the left side There are remittances for two or three hours after which the pain returns There has also been some pain in the eyes No vertigo or staggering Projectile vomiting two or three times a day for the last six weeks No dizziness There has been some obscuration of vision in the left eye for the last two months A gradual loss of strength with slight loss of weight has been noted No paralysis or weakness present

No palpitation hemoptysis or hematemesis

Slight cough and dyspnea noted

No urgency frequency or hematuria

*Past Medical History*—Fourteen years ago he had very severe headaches with almost complete loss of vision This condition all cleared up No other sickness

*Social History*—Laborer in the coal mines Home conditions fair No alcohol or tobacco

*Family History*—Mother and father dead cause unknown Wife and one child living and well No miscarriages

*Physical Examination*—Well nourished well developed adult white male He lies in bed with his hands to his head as though in considerable pain It is almost impossible to make him understand what is said and for this reason it is difficult to obtain any impression as to his mentality The few English words that he can speak are fairly clear He seems to have no difficulty in articulation and he talks intelligently in his own tongue to his wife She says that she has not noted any deterioration in his mentality

*Head* Coarse and thick scalp otherwise normal No bony prominences Some tenderness to percussion over the left frontal region

*Teeth* Some old stumps and a marked pyorrhea Tonsils negative

*Neck* No thyroid enlargement postcervical enlargement or vascular pulsation

*Thorax* Expansion free and equal no abnormal signs to palpation percussion or auscultation over lungs



Heart No enlargement murmur or arrhythmia noted

Abdomen No visible masses no abnormalities to palpation  
No inguinal axillary or epitrochlear adenopathy

*Cranial Nerves*—I No apparent loss of the sense of smell right or left

II Pupil horizontally oval and react only sluggishly to light and in accommodation Eye movements apparently normal when not being tested but when an attempt is being made to test him he does not understand commands and fail to rotate There is apparent deviation on attempt at near fixation but as he sees very little except light the poor reaction may be due to that Perimetry tests show extreme uniform bilateral contraction of the visual fields typical barrel vision Vision R ht 6/12 left 6/21 Pupil clearly slightly dilated media clear to ophthalmoscope optic disk completely obscured by swelling amounting to 4 to 5 diopters in the right and 5 to 6 in the left eye bilateral papillitis

III IV VI No paralysis or pareses of the ocular muscles

V Bilateral corneal reflex no facial anesthesia maxillary contract firmly and equally right and left

VII No weakness of the facial musculature right and left

VIII Both tympani slightly retracted cones of light good no pain in ears no discharge hearing 20/20 AC > BC both sides Weber = no mastoid tenderness

IX Sense of taste difficult to determine but apparently normal

X Gag reflex normal palate raised normally right and left uvula not deflected

XI Raises both shoulders equally and well no sternomastoid weakness

XII Tongue protrudes normally in the midline no atrophy

*Extremities*—Arms No wasting or paralysis of movement All muscle movements powerful and equal right and left No dysmetria finger to nose or finger to finger no ataxic or adiadochokinesis or loss of sense of position or passive movement no loss of the finer movements of fingers right or left No sensory loss in the upper extremity

R Exes	R h	Le f
B cep	3	3
T p	3	3

Thorax No sensory loss

Abdomen No sensory loss Abdominal and cremasteric reflexes prompt and equal right and left

Le s No wasting or paralysis of movement All muscle movements powerful and equal right and left No dysmetria heel to knee no loss of sense of position in the toes no Romberg no abnormalities of gait or station no loss of vibratory sense No sensory loss noted

R fl	Rgh	Le f
P t ll	3	3
A h ll	3	3
B b l	0	0
Cl	0	0

11/3/22 Apparently deviation of the movement of the right eye to the nasal side and consequently defective convergence Slight weakness of the left side of the mouth in movement noticed Blood and urine negative to repeated examination

Wassermann test on blood and spinal fluid negative in all dilution on two examinations Spinal fluid pressure 25 mm Hg 3 cells per H P F Queckenstedt test negative x Ray of skull negative No pituitary fossa enlargement

Summary of Positive Findings—Severe headaches at first occipital then frontal especially on the left side

Loss of vision bilateral papillitis more marked on the left

Slight limitation of movement O D to nasal side and defective convergence

Slight weakness of left side of mouth

Tenderness to percussion over left frontal region

Tentative Diagnosis—Brain tumor—position undetermined

10/30/22 Ventriculogram Patient on face head turned to the left trephine opening in the right parietal region under local anesthesia Right ventricle tapped pressure of fluid 20 mm Hg 30 c c of fluid withdrawn pressure 10 mm Hg 40 c.c.

of air injected pressure in ventricles 40 mm H<sub>2</sub>O. Taken to the x-ray department and four plates made right and left lateral A-P and P-A. Air removed after plates were made. Except for slight headache the patient had no reaction after the procedure.

**Ventriculogram Diagnosis**—In the A-P view (Fig. 94) the left ventricle seems entirely occluded but in the P-A view (Fig.

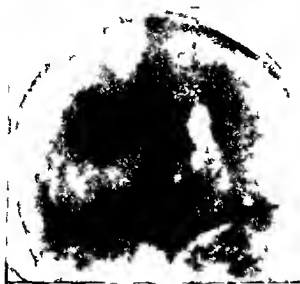


Fig. 94—Ant. post. r. n. r. n. p. l. t. h. u. n. g. t. h. m. p. l. t. o. c. c. l. f. t. h. t. r. i. b. r. a. f. t. h. l. f. t. v. t. l. h. d. t. h. t. h. f. t. h. r. i. g. h. t. f. i. l. l. s. r. n. l. l. y.

95) the posterior horns of both ventricles are patent and filled with air. In the lateral view (Fig. 96) the posterior horns of both ventricles are well filled but the anterior horns especially the left seem to be obstructed. It would appear that the anterior horn of the left ventricle is shut off. Coupling this fact with the persistent left frontal headache and tenderness to percussion in this area and the remarkable papilledema in the left it seems probable that the tumor is in this location. For this reason at

would be advisable to raise a left frontal osteoplastic flap and if no tumor is found to perform a decompression under the base of it in the left frontal region

11/7/22 Tendon reflexes on the right side slightly increased over left Pseudoclonus on right Babinski on right none on left Abdominal reflexes equal on two sides Right grip weaker than left Investigation of cranial nerves difficult on account of

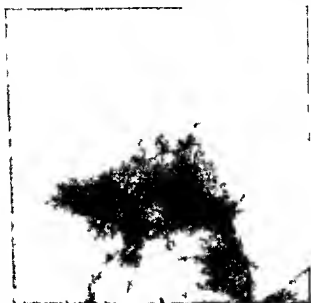


Fig 95—P t t y p l t m d ft fill g p th t l  
with Th po t h rn d bod f both t l h w t be  
p t l

lack of co operation There is considerable mental uncertainty manifested not only in lack of co operation but also inability to understand commands This seems more than can be accounted for by the language difficulty and an indifference to the presence of the examiner Frequently puts left hand to head and moans Evidence at present indicates a slight disturbance in the left motor cortex either as the result of the ventriculogram or due to the encroachment of a tumor

Operation —11/13/22 —A large left frontal osteoplastic flap was turned back under endopharyngeal ether anesthesia. The flap extended from just behind the Rolandic fissure to the eye brow and from the midline to the base of the skull in the temporal region. There was but little bleeding while the flap was being laid back as the area had been blocked off with novocain and adrenalin. The dura was extremely tense. An attempt to tap the ventricle on the left side was made but instead of entering



Fig. 96 — A view of the frontal lobe, showing the body of the ventricle filled with blood.

the ventricle a small cyst containing about 5 to 10 c.c. of a clear yellow fluid was encountered. This was suggestive of a glomus tumor which had become cystic. The tapping of the cyst did not in any way relieve the dural tension. For this reason we tapped the ventricle on the right side. In this we were successful and the dural tension was somewhat relieved, not sufficiently however to turn back a large dural flap. We therefore made a segmental opening of the dura and noted that the cortex was of a yellowish color rather pale and the convolutions

flattened out. The brain commenced to herniate as soon as the dura was opened and considering the nature of the tumor we determined to close the dura and replace the bone flap after filling the cyst with air for the purpose of discovering its exact location. After some trouble the dura was closed. An attempt



Fig 97—A t pot re pl t m d th p t g t bl ft th  
y t ca ty h d b fill d w th Th d m f th y t th pla  
l ly bl Th treph ope ga d th dg f th t plast  
fl p lso h wn

to locate the cyst with an exploring cannula resulted in the evacuation of a larger and deeper cyst about 30 c c of a similar fluid being removed. The dural tension now entirely disappeared. Thirty five c c of air were injected into the cyst and the flap replaced. The patient was taken to the x ray department and

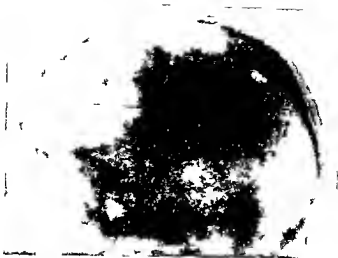


Fig 98—Lat ral pl t m d th ope t g a b l h g th ea f th  
y t th f t ral pl

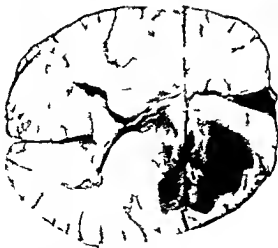


Fig 99—Ph tograph f th b t psy Th b an h be sec  
t d th h rz l pl Th t m se th l ft f tal f be  
occl ding th h f b l Th body d post h rn f  
th e l m y be se t be pa l h l th ght t l h n  
t be tir ly f Th cy d ge rat wh h h t m h d go  
well h wn Th ppe half f th bra sect se

lateral and anteroposterior plates made to outline the position of the cyst (Figs 97-98). The patient was then returned to the ward in good condition. There was no marked postoperative reaction. On the second day the wound was dressed and found in good condition. The patient was clear mentally—a favorable sign in gliomatous cases—but rather restless. He strained a great deal while being dressed. About sixty hours after operation he suddenly sat up in bed, fell back unconscious and died in three hours. At autopsy the operative field was in good con-



Fig 100—Th l h lf f h t l t th gh th b Th t  
m d t l t h p t th a t h f th l f t t l h w

dition. The tumor seen in the plates was found (Figs 99-101). Pathologic report: Gliosarcoma.

**Comment**—This case demonstrates the size to which a gliomatous tumor of the brain may attain without producing other than pressure symptoms if located in a silent area of the brain. The absence of any motor speech loss seems remarkable but close questioning of the patient's wife before his death revealed the fact that he had never seemed to have any difficulty in articulation. It is problematic how long the tumor had been



present. The onset of symptoms dated only two months prior to admission the history of the blindness of fourteen years before which soon cleared up has in our opinion no bearing on the present condition but from the size of the growth and the amount of cystic degeneration it had undergone he must have carried the lesion for a much longer time than that.

Two conditions in which the injection of air may be of very definite value are made manifest. The ventriculogram showed

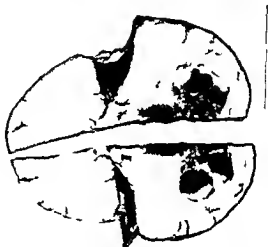


Fig. 101.—Frontal section through the brain through the tumor showing the cyst distant from the surface of the brain.

that the anterior horn of the left ventricle was occluded. This fact placed the pathology in the frontal lobe for the body and posterior horn of the left ventricle was filled with air showing that the foramen of Monro was patulous. The air injection of the cyst determined its dimensions and exact position. Had the outcome been more fortunate we would have been able to treat the lesion with intelligence. But with a glioma of this size the prognosis would have been extremely grave.

